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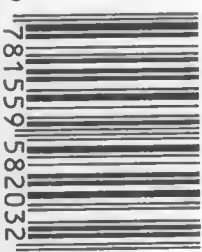
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STRIKE COMMANDER

The Official Strategy Guide and Flight School 

Bruce Shelley

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1. *How many people are there in your family?*

an hour, until it has yielded up half or three-quarters.

and right on the edge of the cliff.

to find the technical staff to do the job.

1. The first step is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

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1. The first step in the process of identifying a problem is to recognize that a problem exists. This involves gathering information about the situation and identifying the specific issue that needs to be addressed.

1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

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1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

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INTRODUCTION—WELCOME TO FLIGHT SCHOOL



Strike Commander is a combat adventure about mercenary F-16 pilots that takes place in the year 2011. Playing is almost entirely concerned with flying the F-16 in combat. To succeed in the variety of missions that the story presents, you must become accomplished in all facets of flying and fighting in this aircraft.

The enemy aircraft you engage around the world range from transports and obsolete MiG-21s to tougher opponents such as the F-15 Strike Eagle and the F-22 Advanced Tactical Fighter. Pilots you engage may be rookies, veterans, or aces. You are also required to be proficient in using the F-16 as a tactical bomber, dropping smart weapons, unguided bombs, and rockets on various ground targets, including warships.

It's not easy to be an F-16 pilot—learning the job takes time. This strategy guide is intended to speed up the learning process and make it more comprehensible. By reading and working your way through the chapters in this book, you'll more quickly reach a satisfactory level of competence in the F-16. The guide is written primarily for rookie pilots, especially those apprehensive about flight simulators, but there is helpful instruction here for everyone. This guide answers questions before they are asked, reduces the frustrations of rookie pilots, and helps you quickly get into the fun, adventures, and challenges of *Strike Commander*.

Learning to Fly

By taking the time to experiment as the text leads you through the capabilities of the F-16, you will learn to fly. You will learn to

easily orient yourself in the air, determine where you are relative to the ground, discover quickly where enemies are, and bring the full capability of the F-16 under control.

The first *Strike Commander* training mission can be overwhelming—no amount of studying can do away with that initial feeling of “information overload.” But by following the strategy guide through practice missions, frustration and bewilderment fade. Keystroke by keystroke, step by step, mission by mission, you learn to fly.

As an alternative to the time-consuming process of trial, error, and starting over, the strategy guide discusses each aspect of flying and fighting in the F-16, giving instructions on how the F-16 works, how to control it, and what can be done with it. Each chapter discusses one major skill that you need to master. The chapters are organized in the order in which you need to learn them. They are then available later to be quickly referenced when you need a refresher.

For example, Chapter 2 describes the single most important feature of your F-16 cockpit. This is the heads-up display, a group of electronic readouts that you can read off a Plexiglas screen as you look forward through the cockpit canopy. Much of the critical information you need to fly competently can be read off this display. Because of its importance, learning about the heads-up display is the first step in mastering the F-16.

The designers of *Strike Commander* have greatly simplified the work an F-16 pilot must do to keep the aircraft in the air and use its weapons effectively. The player interface has been made as clear to understand and as simple to use as possible. However, flying and fighting remain complicated, despite all of these game enhancements, and they are of no help if you don’t know how to access them or use them. This strategy guide helps you become familiar with these enhancements so that you can refer to them with minimum effort.

After the discussion of the heads-up display, the strategy guide introduces you to the basics of flying in Chapter 3. This is one of the key chapters in the book. Take the time to go through it carefully and don’t move on until you are comfortable with the basic flying controls of the F-16.

The practice time invested in learning to fly pays off when you engage in combat, because the key to any successful mission is placing your F-16 in positions from which your weapons can hardly miss. Great weapons are worthless if you can’t fly your aircraft well enough for weapons to be used effectively. Poor flying skill may also mean a steady diet of enemy missiles and shells up your backside.

Once you are comfortable with how the F-16 is controlled in the air, read on to learn about what the F-16 can do.

What the F-16 Can Do

The F-16 was designed originally to be a small, no-frills alternative to larger air superiority fighters like the F-15. The F-16 was to be fast and highly maneuverable, yet relatively inexpensive. As such, it was to supplement its larger cousins in certain roles while reducing costs. The first F-16s were delivered to the U.S. Air Force in 1979, and it soon appeared in other air forces around the world.

Early on in its career, the F-16 was found to be a remarkable airplane. It fulfilled all of its design requirements and proved to be both fast and maneuverable. It was designed to be the best air-to-air “knife fighter” in the world, and it was. Even mediocre pilots became great dogfighters in the F-16.

Within a few years of going operational, experiments had proved that the F-16 was also an excellent ground attack aircraft. It scored very high in several bombing competitions and became known as a fighter/bomber, not just a fighter. Its attack capability caught worldwide attention when eight F-16s of the Israeli Air Force destroyed the partially constructed reactor of Iraq’s Osirak nuclear power plant at Tammuz.

The F-16 is now considered a multimission aircraft, equally capable in air-to-air and air-to-ground engagements. It can be used for interception, escort, combat air patrol, air superiority, and ground attack. Even a modestly skilled pilot can come out on top against the best fighter aircraft in the world.

The F-16 is a versatile aircraft. It can load a full complement of air-to-air missiles, including the aging, short-range, AIM-9J heat seeker that targets infrared images (mainly the rear of aircraft and their engine exhaust), the newer AIM-9M (all-aspect heat seeker), and the AIM-120 AMRAAM (all aspect, medium range, radar guided).

As a ground attack aircraft, it has the strength to carry a significant ordnance load and the maneuverability to be effective against the entire spectrum of ground targets. It can be used against tanks, buildings, radar sites, antiaircraft positions, runways, and ships. It can carry cheap iron bombs and rockets, but these require superior pilot skill for effective use. It can also carry the more sophisticated smart bombs that guide themselves into the target, but these are expensive and not always available to cash-starved mercenary pilots.

The F-16 also carries a Vulcan 20mm cannon built into its frame. You aim the cannon by pointing your aircraft, which is another good reason for learning to fly well. The F-16, like all fighters, carries only a limited number of shells for the cannon, but it can be very effective in a dogfight because of its high rate of fire and the destructive impact of its high-velocity rounds. Even a round that hits an aircraft in a nonvital spot may still do enough damage to cripple the airplane, probably sealing its eventual fate.

The cannon may also be used for ground strafing, but the effectiveness of this is minimized because of the high pilot skill required and the relatively small number of 20mm shells carried. Vulcan ammunition is cheap, however, and a pilot who can destroy ground targets with gunfire can really help the bottom line.

The F-16 is fun to fly because of its maneuverability. It is the only military aircraft built in the United States today that uses the fly-by-wire system. The flaps, rudder, elevators, and ailerons are controlled by electronics, not hydraulics, as in most planes. An on-board computer registers the pilot's wishes regarding these flight controls, computes how best to achieve the effect desired, and nearly instantaneously sends the electronic signals to bring about the maneuver.

This fly-by-wire system makes it possible for the F-16's pilot to control an inherently unstable aircraft. The unstable design is what gives the F-16 the maneuverability that few current or planned aircraft can match.

The designers of *Strike Commander* have enhanced the F-16 and the game environment with a number of optional features that make flying the F-16 even more fun and interesting, especially for those new to flight simulators. These features do not exist in the early 1990s, but in twenty years they may very well be standard equipment. Optional features can be turned on or off, but they can make the life of a rookie F-16 pilot simpler and less dangerous. Some of the options allow you to simplify flying by turning off the possibility of midair collisions, stalls, the effects of gravity on the pilot, and even the brightness of the sun.

Special optional features are discussed in other chapters. For example, air-to-air radar today can only look forward, leaving you blind to the rear; in Chapter 5, the benefits of the optional 360 degree radar are discussed as part of the introduction to air-to-air radar.

As a mercenary F-16 pilot of the Wildcat Squadron, you are called on to carry out all types of missions. You'll escort unarmed transports, fight for air superiority, intercept incoming bombers, bomb buildings, crater runways, attack warships, take out

surface-to-air missile (SAM) batteries, silence antiaircraft guns, knock out radar, and strafe ground vehicles. You will be required to use every weapon in the F-16 arsenal competently, and this guide helps you do it.

Inside Strike Commander

When you begin play, you have the choice of jumping right into the *Strike Commander* game or of practicing first by conducting some training missions. New players should attempt at least a few training missions before starting the complete game. Training missions come in two types: dogfight or search and destroy.

Dogfights are air combat missions, pitting you against enemy aircraft. You can go up against enemy aircraft one at a time, or against several different types at the same time, or even a large group. Try yourself against any of the types of aircraft that you encounter in the full game, including some that are still on the drawing board in the early 1990s, but remember—enemy pilots can be aces, veterans, or rookies.

Search-and-destroy missions are ground attack missions. Load the F-16 with the type of ground attack weapon you want, and then travel to a place in the training world where suitable targets are found. You can set the game for unlimited ammunition and then repeat bombing runs over and over until you run out of fuel. However, most training world locations containing targets are defended, so be prepared to knock out or evade antiaircraft missiles and guns to get in your practice bombing.

Dogfight training missions can turn into search-and-destroy missions once you have successfully engaged your air opponents. By loading ground attack weapons along with air-to-air weapons, you can do some bombing on the way home.

Training missions offer the opportunity to experiment with different game flight options, such as flying with and without the effects of *G* forces. The training world has a number of interesting terrain features to fly over. This is a great way to sightsee and show off *Strike Commander's* superb graphics to friends. The dangers and distractions of the training world are minimized, compared to what can pop up in a real game mission.

The full game of *Strike Commander* requires skill with all ground attack weapons. At the same time there is a material benefit for conserving weapons and getting the job done with the least expensive weapon possible. For these reasons, ground attack practice pays dividends in the full game. You want to be able to complete an attack mission with the cheapest weapon possible.

When a sophisticated and expensive weapon is a prudent choice, you want to complete the mission at the minimum expense and not waste costly munitions.

The full *Strike Commander* game is a sequence of missions that follow the story of the Wildcats, the squadron of mercenary pilots to which you belong. Each mission is a chapter in the story. Some of the missions are optional, or may be undertaken in the order you choose. As you complete mission after mission, the story of the squadron unfolds. With sufficient success you are promoted to squadron commander and acquire new responsibilities for squadron management. Eventually, the story reaches its dramatic finale in a tough last mission.

The year is 2011 and the world is in turmoil. A new civil war is breaking out in the United States following the bankruptcy of the government. Further war in the Middle East has destroyed most of the oil production there. The nationalism that broke up Yugoslavia spreads throughout Europe. Multinational corporations declare their independence of any government authority and begin arming themselves. In this environment there is opportunity for mercenaries. Turkey provides a secure base for many mercenary aircraft squadrons, benefiting from the money they bring in.

Mercenary life is tough. Contracts take the air units all over the world and match them against a wide range of opponents. Mission requirements change from week to week. One week pilots are dogfighting top-of-the-line fighter aircraft and the next they are bombing ground forces. Although the pay is normally good, especially for squadrons willing to take on really dirty assignments, expenses are also high. A couple of failed missions in a row can mean bankruptcy.

Among the mercenaries, one squadron is unique for not accepting missions that they consider immoral. These are the Wildcats, led by James Stern. In consequence of this stand, the Wildcats struggle each month to break even, even though they are recognized as a top outfit. Several years ago one of the Wildcat's best pilots, Jean-Paul Prideaux, broke with his friend Stern to form the Jackals. Prideaux's Jackals take on any mission if the price is right, and are now one of the most profitable of the mercenary squadrons. It's just a matter of time before the Jackals and Wildcats find themselves on opposite sides, fighting each other for a big payoff.

Each *Strike Commander* mission is a separate game in and of itself. You take off, fly to preplanned locations in the mission world, carry out the mission as briefed, and return to base. Save the

game after completing a mission successfully. That way, if something goes wrong during a mission, you can repeat it until you get it right. Missions become progressively more demanding as the game goes on. You may find that a new mission requires skills that you are weak in. In this case work through some training missions to raise your skill level near that required before returning to the game.

You can measure how you're doing over the course of a *Strike Commander* game in several ways. A kill board at the Wildcat base shows how pilots are doing in both ground kills and air kills. You can compare your record to those of the other pilots. Also at the Wildcat base is a ledger book that shows the current financial standing of the squadron. When the squadron is doing well, the bank balance is healthy, and vice versa. Finally, *Strike Commander* keeps a tally of how well you do on each mission. This running score of your accomplishment to date can be checked between missions. Measure your score for the complete game against your score for later sessions.

Using This Guide

Players new to *Strike Commander* and flight simulators in general should at least skim the entire book, if not read it through completely. This introduces you to all features of the F-16 and *Strike Commander* in a logical manner. The book begins by examining the most important cockpit display, the heads-up display (or HUD) in Chapter 2.

After introducing the HUD, the guide goes on to discuss the basics of flying the F-16. The flying lessons in Chapter 3 lead you through the principles of flight and the various ways to maneuver the F-16. Topics include climbing, diving, turning, and stalls. An understanding of how to read the HUD and the basics of flying is enough for you to attempt some training missions and begin experimenting with the F-16. But there is a great deal more to learn.

Chapters 2 through 4 complete the introduction to the cockpit and explain how to look around. At this point some of the exceptional features of *Strike Commander* are introduced, including camera views that let you watch game action from outside your F-16, or from the target of your weapons, or by riding along with your weapons. You miss a lot of the fun and excitement of *Strike Commander* if you don't understand how to access these camera views and when best to watch them. Reading this guide helps make using the cameras easy.

Parts of Chapter 4 help you learn how to find out where you are in the sky, relative to the world, the ground, and nearby aircraft. You need to be able to find your way, obviously, to complete missions and return home. *Strike Commander* makes this easy to do with a little practice.

At the same time, you need to understand where you are headed, how close the ground is, where enemy aircraft are, and where ground targets are. This is called situational awareness, and losing it can be costly. *Strike Commander* includes a number of features that help you keep aware of the situation. Some of these are optional and science fiction today, but of great help to new pilots.

Chapter 6 is devoted to all of the optional features of *Strike Commander*. These include features that make the game look better, or run faster, as well as game options. The ability to turn a number of game options on or off allows you to customize the game—you can start out by making *Strike Commander* relatively easy to play, and then increase the challenge as you become more experienced. In this way you can start having fun very quickly.

Chapters 7 through 12 deal with combat, both in the air and against targets on the ground. Each major combat skill is discussed in its own chapter. For example, using the Vulcan cannon during dogfights is the topic of Chapter 9. For each topic the discussion covers not only the rudiments of the skill, but also offers hints and examples of what tactics are most effective.

Refer back to the combat chapters as you work through the *Strike Commander* missions and need to review how to be most effective with rockets, or the Durandal bomb, or any other weapon.

Chapters 13 and 14 deal with takeoffs, landings, and some advanced flying concerns. One of the Gameplay options available is the autopilot. This feature lands your F-16 at the end of a mission or performs a takeoff at the start, at your command. This is useful to new pilots, who are especially apprehensive about landing. When you want to learn how to land on your own, information here can help you master the technique.

The last chapter of the book deals with strategies for missions, both in the training world and in the *Strike Commander* game. Here you learn ways to make training missions more interesting and useful. The discussion describes each of the training world locations, alerting you to any points of interest or hazards. A number of considerations are also discussed for *Strike Commander* missions, including the use of your wingman and squadron management.

The section on squadron management in Chapter 15 describes the issues that face you when you take over command of the Wildcats. At that moment you become responsible for the finances of the squadron and weapons procurement.

At the end of the strategy guide are a number of appendices that enhance your understanding and enjoyment of *Strike Commander*. Appendix A is a printout of the latest available README.TXT file, making it handy for quick reference. Appendix B is a list of all the flagged hints and warnings found throughout the guide. Putting these in one place should make them easier to reference.

Appendix C is an introduction to the *Playtesters' Guide* for those of you who don't own it yet, but are considering it. It really is a must if you wish to achieve a top score and this appendix tells you why.

Appendix D is an introduction to the new *Tactical Operations*® supplement to *Strike Commander*. This scenario package includes a new executable file for *Strike Commander* and some new features. Among these are a new, realistic flight mode and the capability of flying the F-22 Advanced Tactical Fighter, which you capture during the last of the original missions.

The most exciting part of *Tactical Operations* is a new series of missions that describe a new chapter in the history of the Wildcats. These new missions take the squadron to Syria, South Africa, Siberia, Nicaragua, Hawaii, and Ireland. This appendix provides information on each mission, including a map of the region and data on the enemies you can expect to encounter.

Before getting into this strategy guide, one final word about equipment: this guide assumes that all players are using a joystick. If you aren't, we strongly suggest you buy one—they are not expensive. How can you expect to get the feel of flying if you are using a mouse or keyboard for flight control? If you choose not to use a joystick, you will have to convert any joystick-specific instructions to your alternative method of control.

of the system. The system is designed to be used in a variety of ways, including as a standalone system or as part of a larger system. The system is designed to be used in a variety of ways, including as a standalone system or as part of a larger system.

[illegible]

...and I am not alone in my opinion. I have heard from many other people who are also concerned about the future of our country. They are worried about the direction we are heading in, and they want to see change.

[illegible]

The above information was obtained from the files of the FBI, New York Office, dated 10-18-67.

[illegible]

THE HEADS - UP DISPLAY



2

The first step in your F-16 orientation is sitting down in the cockpit and becoming familiar with the most important feature, the heads-up display (HUD). This is the primary source of information regarding the performance of your aircraft. You must be able to read and understand this display quickly.

This chapter sets up a basic training mission that gets you into the air and studying the HUD. The mission objective can be ignored or completed as you choose. Once you have learned how to read the HUD, continue on to Chapter 3 for an introduction to the basics of flying.

To get a look at the HUD, load *Strike Commander*. Beginning at the Start-Up menu, shown in Figure 2-1, choose the following options in the order shown to set up a simple training mission and get into the air.

1. Start-Up menu: Select TRAINING MISSION.
2. Training Mission menu (see Figure 2-2): Select DOG-FIGHT.
3. Dogfight menus: Select One enemy plane; TU-95; 25,000 feet; VETERAN opponents.
4. Weapon Loading screen (see Figure 2-3): Move your joystick cursor around the screen to see what weapons are available, but don't load any for now. Move the cursor onto the F-16's cockpit, triggering the prompt Fly Mission. Click once to begin the mission.
5. When the cockpit appears, press the [Alt] - [O] keys to open the Options menu.



Figure 2-1
The *Strike Commander*
Start-Up menu

6. Press the Gameplay button.
7. At the Gameplay menu, press the Rookie button on the right side to set the level of difficulty to the Rookie level.
8. Exit the Gameplay menu and Options menu to return to the mission.

HUD Description

When the training mission begins you find yourself already airborne in your F-16 at an altitude of 25,000 feet. Press the **[Alt]**-**[P]** keys to pause the game so you can examine the cockpit. You



Figure 2-2
The Training Mission
menu

Figure 2-3
Weapon-Loading
screen



are looking forward, over the nose of your aircraft, as shown in Figure 2-4.

Don't panic when you first see dials and toggles all over the front of the cockpit. Of the instruments you see, only three are of consequence: the HUD (the white symbols visible in front of you), the Threat Warning Indicator, and your Missile Warning Lights, all marked in Figure 2-4. Nothing else is of any use. Ignore for now everything but the white symbols to your front. The Threat Warning Indicator and the Missile Warning Lights are discussed later in Chapter 4.

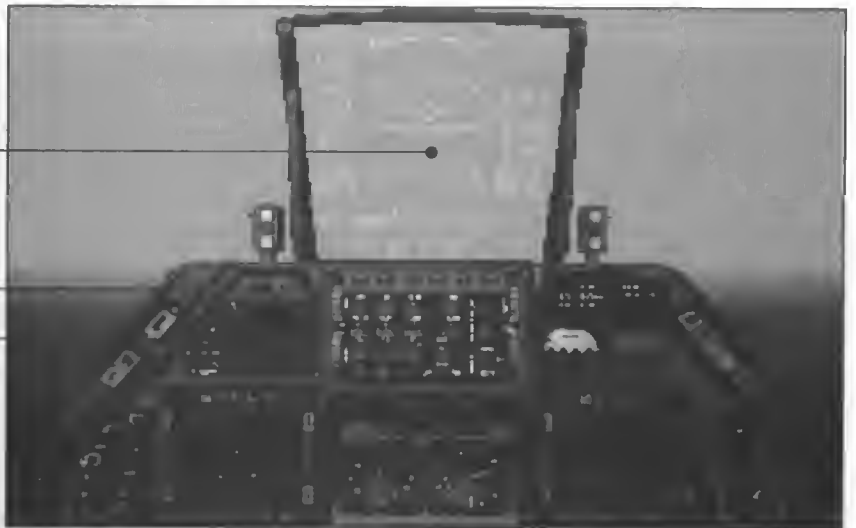
HUD

Missile Warning Lights

Threat Warning Indicator

Figure 2-4

The cockpit view,
looking forward
over the instrument
panel and through
the F-16 windscreen



The Windscreen and HUD

High in front, and extending back and up over your head, is your Plexiglas windscreen or canopy. (Pilots don't call this a windshield.) Between you and the windscreen is a flat piece of clear Plexiglas mounted upright on top of the instrument panel. The white numbers and symbols that appear on this Plexiglas plate constitute your headsup display, or HUD. When looking straight ahead over the instrument panel, you are simultaneously looking through both the HUD and the canopy.

Through the windscreen you can see the sky, including a layer of clouds. No aircraft are visible through the windscreen at this time. The TU-95 that you are hunting on this mission is in front of you but too far away to be seen.

Press any key to resume play, then press the **[F1]** key a few times to see the HUD zoom in (as in Figure 2-5) and out (as in Figure 2-4). Zoom the HUD to the level you find easiest to look at and press the **[Alt] - [P]** keys again to pause play.

Most players keep the HUD in close zoom at all times. You may want to make it a habit to go immediately to close zoom at the start of any mission. Not only is the HUD easier to read, but some information appears on the HUD only when it is close. The only advantage to having the HUD at far zoom is that you can see more of the sky.

Notice that there is a small dot right in the center of the HUD. This dot has no specific purpose except to serve as a reference point for other HUD features. Often this dot is hidden by other HUD features at the center. But it is always there.



Figure 2-5
Close zoom of the
HUD

What Is the HUD?

The HUD is an electronic display built into the Plexiglas plate, so the pilot can read it while continuing to look out of the aircraft. This is an important innovation because the pilot can monitor the aircraft's performance without having to look away from the sky.

From the HUD the pilot can read more than twenty different pieces of information, and this number increases when the aircraft is in certain combat modes. Information available includes direction, airspeed, extent of pitch and roll, throttle setting, altitude, and the pull of gravity.

Reading the HUD

The information displayed on the HUD is constantly updated by computers on board the aircraft. In some cases numbers change, in some cases symbology changes, and in some cases electronic tapes scroll back and forth. This section describes what the parts of the HUD are saying and how to read the display as it changes.

Velocity Vector Indicator

The Velocity Vector Indicator (VVI) is the small circle with three lines radiating out from it, found in the center of the HUD, and shown in Figure 2-6. This circle is a symbolic representation of a cross-section of your F-16. The circle itself is the fuselage, the left and right projecting lines are the left and right wing tips, and the top projecting line is the top of the cockpit.



Figure 2-6
Velocity Vector
Indicator within the
HUD

The position of this indicator within the HUD shows your aircraft's flight path (the direction in which your aircraft is moving through the air), relative to an imaginary geometric plane drawn from the nose of the aircraft to its two wing tips. Note the two key elements to understanding what the velocity indicator is showing:

- The concept of the geometric plane defined by your aircraft's wings and nose: the geometric plane your aircraft occupies at this instant.
- The position of the Velocity Vector Indicator relative to the center of the HUD: The position of this indicator shows the direction the aircraft is moving in relative to where it is pointed at the moment.

The Velocity Vector Indicator may show dive or climb. It always shows the dive or climb relative to the nose.

Consider these examples. Fly straight and level, and then push the nose over by pushing directly forward on the joystick. This puts your F-16 into a dive. Initially, the VVI moves toward the top of the HUD because the aircraft has rotated to point downward, but momentum keeps it on the original flight path, flying straight. As the new flight path stabilizes in the dive, the Velocity Vector Indicator drops to the center of the HUD and remains there, even though you are in a dive. Because your dive has now stabilized, the VVI is pointing in the same direction that you are flying.

For another example, from level flight pull back on the joystick to climb. The VVI falls below the center of the HUD and remains there until the new flight path (climbing) stabilizes in the direction pointed to by the nose.

Finally, from level flight move the joystick to the left and then pull back slightly, making a left turn. Watch as the Velocity Vector Indicator drifts to the bottom of the HUD away from the turn. Again, the VVI continues to indicate the direction of the aircraft's original momentum until it is overcome by engine thrust along the new nose heading and the new flight path is stabilized.

Figure 2-7 shows the position of the Velocity Vector Indicator as an F-16 turns to the left. The indicator has dropped within the HUD because the aircraft's momentum is carrying the plane slightly forward while its nose is pulled to the left. The VVI has dropped down because the aircraft has rolled to make the turn and the flight path of the plane is still in the direction of the original momentum. Once the aircraft stops turning, the VVI returns to the center of the HUD.

Figure 2-7
Velocity Vector
Indicator dropping
down in response
to a turn to the left



Note that the position of the Velocity Vector Indicator can be either low or high on the HUD while the plane is climbing. An indicator low on the HUD shows only that the aircraft is moving in a direction below where the F-16 is now pointing. If the plane is climbing, but at a rate less steep than previously, then the indicator is in the high part of the HUD because the flight path continues high before the new, less steep climb stabilizes.



It is possible that in a particularly tight maneuver the Velocity Vector Indicator may disappear off the HUD. This shows that the new direction of the nose is far from the original flight path and previous momentum of the aircraft.

The Pitch Ladder

The Pitch Ladder is the series of lines that look like thin ladder steps centered above and below the Velocity Vector Indicator. The Pitch Ladder is shown in Figure 2-8. This ladder of lines shows the pitch of your aircraft relative to the horizon. *Pitch* is the rotation of your aircraft along its horizontal axis from wing tip to wing tip. Pitch is either nose down and tail up, or nose up and tail down.

Each line on the Pitch Ladder represents 5 degrees of pitch. When the Velocity Vector Indicator is stable on the zero line of the ladder, pitch is 0 degrees and the aircraft is flying directly toward the horizon. In this case the left and right projecting lines of the Velocity Vector Indicator are even with the zero line and can't be seen. If you begin to dive or climb, the Pitch Ladder revolves upward or downward relative to the center of the HUD,

Figure 2-8
Pitch Ladder



but not necessarily to the Velocity Vector Indicator. You can read off the degree of pitch by noting what degree is adjacent to the dot in the center of the HUD.

The Pitch Ladder does center on the Velocity Vector Indicator when the VVI is stable, but the VVI is independent of pitch. You can pitch up 20 degrees, stall, and keep a nose-high pitch, but the VVI falls off the bottom of the HUD (*into the basement*, in pilot jargon).

Note that the lines on the ladder are dashes in the area of negative pitch. When your aircraft is diving, dashed lines appear next to the Velocity Vector Indicator. Negative pitch is shown in Figure 2-9, which shows the Velocity Vector Indicator next to

Figure 2-9
Velocity Vector
Indicator and Pitch
Ladder indicating
negative pitch,
or dive



dashed lines, indicating that the F-16 is currently pitched forward, or downward. Also note that the ladder lines have short prongs on their ends. These prongs point continuously to the horizon.

When you put your F-16 into banks, dives, and so on, the Pitch Ladder is in continuous motion. It not only revolves to show your degree of pitch, but also rolls around the Velocity Vector Indicator. The ladder and the velocity indicator can thus graphically help you understand the position of your aircraft relative to the horizon and level flight, even when nothing but blue sky and clouds are visible through the windscreen.

The Pitch Ladder may be toggled off and on from the Options screen. See Chapter 6 for more information about this option.

Airspeed

From the HUD you can quickly see how fast your aircraft is traveling and how high your throttle setting is. During landings and bombing runs you may want to cut back your speed to slow your approach and from the HUD you can easily read your airspeed. Airspeed information can be read from the Airspeed Tape, the Airspeed Dash, the Mach readout, and the Throttle Setting, all marked in Figure 2-10.

Airspeed Tape and Airspeed Dash

The Airspeed Tape is the graduated measure on the left side of the HUD. Each hash mark on the tape represents 10 knots of speed. Three-quarters of the way up the HUD on the inside of the airspeed tape is a dash, topped by either a T or a C. This is



Figure 2-10
HUD airspeed
information

the Airspeed Dash, which shows your current speed through the air. In Figure 2-10 the Airspeed Tape is showing a speed of 73, or 730 knots. One knot of airspeed equals 1 nautical mile per hour.

Airspeed can be read as either true speed when the T is present, or calibrated speed when the C is present. You can toggle between true or calibrated speed readings by pressing the [S] key. In Figure 2-10, the airspeed is shown as T, for true speed.

True speed is your airspeed relative to the ground. This is the way most people think of speed and is especially useful when you are conducting ground attacks with bombs and other weapons. At these times you are concerned about how fast you are approaching your target.

Calibrated speed measures how fast air is passing over your wings and is an indication of how maneuverable your plane currently is. This speed can differ from true speed, depending on whether you are flying into or with the wind. Higher calibrated speeds allow greater aircraft maneuverability because more wind passing over your wings provides more lift. (Lift is discussed in more detail in Chapter 3.)

Setting the HUD to read calibrated speed is most useful when you are dogfighting and constantly maneuvering. Calibrated airspeed in a turn, or corner speed, is the same at any altitude. This is not true when corner speed is measured in true airspeed. For that reason, pilots use calibrated airspeed when maneuvering.

Mach Readout

Just below the Airspeed Tape is a set of numbers followed by an M. This is the Mach readout, or your Mach number, showing the ratio of your aircraft's speed to the speed of sound. For example, a Mach number of 1.5 M indicates your aircraft speed is one and a half times the speed of sound at your current atmosphere. In Figure 2-10, the Mach readout reports the F-16 is traveling at a speed 1.22 times the speed of sound.

To a certain extent, as you climb to higher altitudes, lower air resistance allows greater airspeed and higher Mach numbers. However, at the same time, as you climb to very high altitudes the atmosphere becomes too thin to provide required lift. At this point airspeed begins to decline.

Throttle Setting

The Throttle Setting is just below the Mach readout on the lower left side of the HUD, as marked in Figure 2-10. You can read here how high your throttle is set. Setting your throttle higher sends

more fuel to your engines and increases their thrust. The throttle is adjusted by pressing number keys from [1] (lowest power setting) to [0] (highest power setting). The throttle can be turned off, cutting all fuel to the engines, by pressing the [] key, usually found to the left of the [1] key. Cut fuel to the engines only after you have touched down in a landing.

There are two categories of throttle setting: military power and afterburner. Afterburner provides extra power that may be needed in emergencies but burns fuel at a very high rate. Military power extends from settings 1 through 5 and is marked as MIL 1, MIL 2, and so on. Figure 2-10 shows an F-16 with a Throttle Setting of MIL 4.

Afterburner settings are reached with keys [6] through [0] and are marked AFT 1, AFT 2, and so on, with the setting [0], AFT 5, for maximum power. Be aware that changed Throttle Settings take some time to increase your airspeed. They are not instantaneous, but the higher the setting the faster the impact is felt.

Leaving your aircraft on afterburner quickly reduces your fuel and may force you to return to base prematurely. Also, in air-to-air combat, running on afterburner makes it easier for enemy heat-seeking missiles to lock onto your F-16.

Altitude Information

Along the right side of your HUD are a number of displays related to the height of your F-16 in the sky, known more commonly as its *altitude*. It may be important from time to time to be able to tell at a glance how high you are over the terrain below, and whether you are losing or gaining altitude. The displays related to altitude are the Altitude Tape, the Altitude Over Sea Level Dash, the Altitude Above Terrain Caret, and Altitude Over Terrain Readout, all marked in Figure 2-11.

Altitude Tape

The Altitude Tape is the graduated tape measure on the right side of the HUD. Each hash mark on the tape represents 100 feet of altitude. On the leftside of the tape is the Altitude Over Sea Level Dash. By reading across the tape from this dash you can determine the current altitude of your F-16 above sea level. Note that those are commas in the tape numbers, not periods. For example, a reading of 07,8 indicates an altitude of 7,800 feet. In Figure 2-11, the F-16 is flying at an altitude of 1,300 feet.

The Altitude Tape scrolls up and the numbers decrease in value as your F-16 loses altitude. The tape scrolls down as you

Altitude Over Sea Level Dash
 Altitude Tape
 Altitude Above Terrain Caret
 Altitude Over Terrain Readout



Figure 2-11
 HUD altitude
 information

gain altitude. You can tell from a glance at the relative movement of the tape whether you are climbing or diving.

The Altitude Tape may be toggled off and on from the Options screen. See Chapter 6 for more information about this option.

Altitude above Terrain

Also on the inside of the Altitude Tape, find the Altitude Above Terrain Caret (pronounced like carrot), marked in Figure 2-11. The name of this HUD feature implies that it indicates how high you are over the ground, but notice that is not the case. This caret actually marks the elevation, or altitude, of the terrain immediately below your F-16. This can be important when you are flying close to the ground. Remember, you can be 28,000 feet above sea level and still fly into Mount Everest.

Over uneven terrain the Altitude Above Terrain Caret continuously rises and falls. When the ground is far below you, the caret cannot be seen.

The altitude of the terrain below is monitored continuously by radar and the aircraft's computers use that information to tell you when to pull out, if necessary, and when they are calculating aiming points and release points of some weapons.

At the bottom of the Altitude Tape is a numeric readout of your current Altitude Over Terrain, also shown in Figure 2-10. This expresses in hundreds of feet how high you are over the ground. It is often easiest to check your altitude here when flying low for landings or bombing runs.

From Figure 2-11, add the height of the ground below, marked by the Altitude Above Terrain Caret (500 feet), to the Altitude Over Terrain (900 feet) that your F-16 is currently holding. When added together (1,400 feet) they equal the altitude of your F-16 over sea level and should indicate the same approximate altitude marked on the Altitude Tape by the Altitude Over Sea Level Dash (1,300 feet). The error between the two is due to rounding in the readouts that were added together.

Direction

The basic information you may require regarding the current course and intended course of your F-16 is found in displays along the bottom of the HUD. You can set your intended course through the use of waypoints. Until you reach a waypoint location in the world, it stays marked on your HUD, no matter how turned around and off course you may become. During landings and bombing runs, knowing your course may be helpful in lining up your approach. The displays related to the direction and heading of your F-16 are the Direction Tape, the Current Heading Tic, the Waypoint Caret, and the Waypoint Distance Readout, all marked in Figure 2-12.

Direction Tape, Current Heading Tic, and Waypoint Caret

The graduated Direction Tape is found at the bottom of the HUD. It is a rotating compass marked off in increments of 5 degrees at each hash mark. Each 10 degrees on the 360 degree compass is labeled numerically. For example, the hash mark with a 3 on top indicates 30 degrees. The Direction Tape is marked in Figure 2-12.

Centered above the tape is the Current Heading Tic, which shows the current compass heading of your F-16. For example, if the tape shows 14 under the tick, your aircraft has a current heading of 140 degrees. Headings of 0, 9, 18, and 27 indicate the directions of north (0 degrees), east (90 degrees), south (180 degrees), and west (270 degrees), respectively. In Figure 2-12, the current heading of the F-16 is 4, or 40 degrees.

Also, just above the Direction Tape in Figure 2-12 you can see the Waypoint Caret. The position of this caret indicates the compass direction you must follow to reach your next waypoint. (Waypoints are an aid to navigation discussed in Chapter 4.) Waypoints help you set a destination for your flight and, until you reach it, the Waypoint Caret continually tells you what heading to follow to do so. When the Waypoint Caret is centered on the Current Heading Tic, you are headed directly for your waypoint.



Figure 2-12
HUD direction
information

The Waypoint Caret hangs up to either the left or right side of the Direction Tape when the compass reading for the waypoint is not currently visible on the tape. The tape shows only 30 degrees of the compass at a time. For example, if the waypoint heading is 0 degrees and your current heading is 90 degrees, the Waypoint Caret will be on the left side of the tape.

A Waypoint Caret to the left indicates that for you to return to a heading toward the waypoint it is quickest for you to turn your F-16 to the left. In this example, you need only change 90 degrees to get back on a 0 degree heading. If you turned toward the right, you would have to turn 270 degrees to get back to a 0 degree heading.

Waypoint Distance Readout

The Waypoint Distance readout is found on the right side of the HUD, just below the Altitude Above Terrain readout, as shown in Figure 2-12. This is the distance you must travel to reach the waypoint that you have set. The distance is marked in nautical miles. For example, the readout of D63.2 in Figure 2-12 shows the F-16 is now 63.2 nautical miles from the waypoint.

G Force Indicators

Gravitational forces are discussed in Chapter 14. As a rookie F-16 pilot, *Strike Commander* allows you to ignore the problems associated with pulling negative or positive Gs by turning off the effects of gravity. For right now, you need only know that too many Gs of either type can impair a pilot's ability to see and think, and may

lead to unconsciousness. Too many positive *G*s can also tear an aircraft apart. With gravity effects turned off, you can ignore them for now.

However, some information about gravitational force is always present on the HUD: notice in Figure 2-13 that the HUD continually reports your current *G* force and the maximum *G*s that your aircraft has pulled up until that moment.

Current *G*s Readout

The Current *G*s Readout is found at the top left of the HUD. There are two numeric readouts there. Current *G*s is on top. The notation is read as a number of *G*s, taken to one decimal point. For example, in Figure 2-13 the Current *G*s are noted as 5.4*G*, indicating that the F-16 pilot is currently undergoing a gravitational force equivalent five and four-tenths times the gravity normally felt on earth. The pilot of this F-16 is feeling over five times heavier than normal.

Current *G*s may be positive, negative, or zero. Zero gravity normally is held only for an instant. Negative *G*s are noted with a minus sign (-) in front of the numeric readout. Positive *G*s show no additional notation.

Maximum *G*s Readout

The Maximum *G*s Readout is the lower of the two *G* force readouts, as shown in Figure 2-13. It reports the maximum number of *G*s that your aircraft has safely pulled in the past. You assume that it can continue to pull this many *G*s and stay together. If you



Figure 2-13.
HUD *G* force
readouts

place your F-16 under gravitational force in excess of this maximum, it could tear apart. The maximum Gs that the F-16 in Figure 2-13 can withstand is 9.0, or nine times the pull of gravity at sea level.

The Max G limit may be lowered by carrying weapons outside the fuselage, having brakes on, having flaps down, and by having the landing gear down.

Weapon Mode

Weapon Mode is found in the lower left corner of the HUD, below the Throttle Setting, as shown in Figure 2-14. When you begin a new training mission or take off for a game mission, your Weapon Mode is listed on the HUD as NONE. This means you have no Weapon Mode selected. The types of Weapon Modes that you can select depend on the types of weapons you are carrying. Each weapon that the F-16 can carry is controlled through at least one Weapon Mode.

Next to the Weapon Mode you see the notation 000. This is the Weapons Remaining readout. Normally you read here the type of weapon now activated and the number of them remaining on board your F-16. Because you have no weapon activated, you now see the zeros.

Activating Weapons

To activate a weapon, resume play if paused and press the **[W]** key. Notice that several things happen, as shown in Figure 2-15.



Figure 2-14
HUD Weapon
Mode information

First, a screen pops up at the lower right of your cockpit. This is the Weapons Hardpoint display, one of the multifunction displays available in the cockpit. You can ignore this display for now and read about it later in Chapter 5.

Second, the notation NONE on the HUD changes to STRF. This HUD readout tells you that the Vulcan cannon has been activated for strafing, or ground attack. Your Weapon Mode is now STRF for strafing.

Third, the 000 notation changes to read 999 VULCAN, indicating that your Vulcan cannon is activated and that you have 999 rounds of ammunition remaining. The activated weapon is the one you can fire or launch by pressing fire button #1 on the joystick or the spacebar.

If you continue to press the **[W]** key, you cycle through all of the different weapons loaded on your aircraft. You can activate only one weapon at a time. Activating a new weapon deactivates the previous one. The type of weapon activated determines the Weapon Mode that you are in. Weapon Mode determines the type of radar you can activate. You can ignore radar for now and read about it later in Chapter 5, if you prefer.

The fourth thing that happens is that new symbols appear on the HUD. These are specific to the Weapon Mode that you are in, and help you aim the particular weapon that you have activated. These HUD symbols can be ignored for now. You can read about them later in Chapters 8–12 about air-to-air and air-to-ground combat.



Figure 2-15

HUD indicating
Weapon Mode for
strafing with the
Vulcan cannon



*Once you activate a weapon, it is ready to fire. If you press the **[Spacebar]** or joystick fire button #1, you fire the weapon. During a game mission, accidentally firing a missile or other valuable weapon can be very costly.*

Weapon Mode Types

Each weapon you can carry fits into at least one Weapon Mode. The category of Weapon Mode determines which type of radar can be activated. For example, when you have activated an air-to-air weapon, you cannot activate and read your ground radar.

Table 2-1 lists the types of weapons the F-16 can carry, the Weapon Mode each weapon fits into, and the type of radar that can be activated in conjunction with that mode. Note that the Vulcan cannon and several types of bombs may be activated in two different Weapon Modes.

Weapon Modes are discussed in later chapters about combat.

Intermittent HUD Information

All of the parts of the HUD discussed above are normally visible at all times. In addition, there are other readouts or warnings that appear intermittently on the HUD in special situations. Intermittent readouts include notices that your landing gear is down, your flaps are down, or your brakes are on. You may also receive stall, pull-up, or fuel warnings. These readouts appear on the HUD only so long as the relevant situation continues. For example, the Brake On Indicator appears only when your brakes are on. When you take them off, the indicator disappears from the HUD.

Landing Gear Down Indicator

When your landing gear is down, the word GEAR appears at the top right of the HUD, as shown in Figure 2-16. The gear is raised and lowered by pressing the **[L]** key.

You must have your landing gear down when landing or taking off to avoid a crash. While flying, however, having the landing gear down increases the drag of the wind on your aircraft and slows it down.

Flaps Down Indicator

When your flaps are down, the word FLAPS appears at the top right of the HUD, below the position where the Gear Indicator appears, as shown in Figure 2-16. Flaps are raised and lowered by pressing the **[F]** key.

Flaps are auxiliary air foils attached to the rear of your wings that can provide additional drag and lift when down. They can

Table 2-1 Weapon Modes

Weapon Indicator	Weapon Mode	Radar
Vulcan	DGFT	Air-to-air
Vulcan	STRF	Air-to-ground
AIM-9J	SRM	Air-to-air
AIM-9M	SRM	Air-to-air
AIM-120	MRM	Air-to-air
MK-82	CCIP/CCRP	Air-to-ground
AGM-65D	IR	Air-to-ground
GBU-15	IR	Air-to-ground
LAU3	STRF	Air-to-ground
MK-20	CCIP/CCRP	Air-to-ground
Durandal	CCRP	Air-to-ground

DGFT, Dogfight; STRF, strafing; SRM, short-range missile; MRM, medium-range missile; CCIP, continuously computed impact point; CCRP, continuously computed release point; IR, Infrared imaging.

be useful when trying to reduce speed or increase maneuverability. The notation on the HUD is to remind you that your flaps are down, so that you can raise them when they no longer serve a purpose. Having your flaps down decreases your airspeed and increases fuel consumption. (Flaps are discussed further in Chapter 14.)



Figure 2-16
Intermittent HUD
information

Brake On Indicator

When your brakes are on, the word BRAKE appears at the top right of the HUD below the gear and flaps indicators, as shown in Figure 2-16. Brakes are toggled on and off by pressing the **[B]** key. The brake indicator can refer to either wheel brakes or air brakes, depending on whether you are on the ground or in the air. Wheel brakes work like the brakes on a car's wheels and help bring you to a stop on the runway when landing. Air brakes work like flaps to increase the drag of your aircraft and reduce its air-speed. (Wheel brakes are discussed in Chapter 13, and air brakes are discussed in Chapter 14.)

Stall Warning

When your F-16 is in a stall condition, the word STALL appears in the center of the HUD. This lets you know that your aircraft is falling out of control and that you need to take corrective action to recover. The stall warning remains visible so long as stall conditions continue.

Strike Commander allows rookie pilots to ignore the problems associated with stalls by not allowing them to occur. They can be turned on or off from the Options screen, as discussed in Chapter 6. (Stalls are discussed in more detail in Chapter 3.)

Pull-Up Warning

The Pull-Up Warning consists of a large X and the words PULL-UP, both flashing in the center of the HUD. This warning appears when you are on the verge of crashing into the ground and must pull 4 Gs or more to avoid impact. The warning continues so long as the potential for a crash is present.

The warning can appear not only when you are diving toward the ground, but also when you suddenly approach a tall object like a mountain, canyon wall, or large building.

Even rookie pilots have to pay attention to Pull-Up Warnings or suffer the consequences.

Fuel Warning

The Fuel Warning consists of the word FUEL flashing in the center of the HUD. This lets you know that the fuel tanks are critically low and that you must land very soon.



A good pilot does not ignore fuel warnings! If you don't land quickly, you will crash. Both autopilot landings and player-controlled landings are discussed in Chapter 13.

Now that you are familiar with the main features of the Heads-Up Display, go on to Chapter 3, which introduces the basics of flying the F-16.

It goes right to the heart of the matter and I think you will find it very interesting and helpful.

The first part of the report deals with the main features of the system and the way it is organized. It then goes on to discuss the various aspects of the system and the way it is used. The report is very thorough and covers all the important points.

1. Introduction

The purpose of this report is to provide a comprehensive overview of the system and its various components. It is intended for those who are interested in the system and want to know more about it.

The report is divided into several sections, each dealing with a different aspect of the system. The first section is an introduction to the system and its purpose.

2. System Overview

This section provides a general overview of the system and its main components. It describes the way the system is organized and the way it is used.

The system is designed to be flexible and adaptable to changing requirements. It can be used in a variety of ways and can be modified to suit the needs of the user.

3. Conclusion

In conclusion, the system is a very useful and flexible tool. It can be used in a variety of ways and can be modified to suit the needs of the user.



Your success as an F-16 pilot in combat depends greatly on your ability to control the aircraft in flight. The F-16 must be placed in the proper position from which weapons can be used effectively. To hit enemy aircraft with the Vulcan cannon in a dogfight, the F-16 must be pointed accurately because the gun is mounted along the aircraft's frame. Bombing runs and rocket attacks require a proper approach to the target to have a chance of scoring hits. Maneuvering and positioning the F-16 properly are skills developed through practice, and are based on an understanding of the basic concepts of flight.

This chapter begins with an introduction to the physics of powered flight. Four physical forces interact to make powered flight possible. Knowing how they work is important for you to understand how the F-16 is controlled.

After this physics lesson we go on to discuss the technical aspects of flying the F-16. Basic instruction includes flying level, climbing, diving, and turning. In addition, we'll discuss some basic flight maneuvers and stalls.

The Wildcat squadron is considered one of the best. If you want to survive and be a valuable member of the team, you must first become a good pilot. Understanding this chapter is the first step.

The Physics of Flight

Flight is the act of passing through the air by the use of wings. *Aerodynamics* is the study of the four forces at work against the

wing as it moves through the air. The four forces acting in flight are gravity, thrust, lift, and drag, as shown in Figure 3-1. When the four forces are in equilibrium, flight is possible. When the equilibrium is disrupted, the aircraft may be forced into turns, climbs, dives, or changes in speed. *Turbulence*—a disturbance in the air currents around the wings—may be the result of force imbalances, or may itself cause force imbalance.

Gravity

Gravity is the pull of the earth that gives us weight and keeps us on the ground. It is measured in multiples of G , where 1 G equals the force of gravity at sea level. Standing at sea level, the weight we feel on our feet is our mass being pulled down by the force of 1 G . At the top of Mount Everest we weigh slightly less than we do at sea level, because there the force of gravity is less than 1 G , but the difference is too small to notice.

Have you ever been on a roller coaster, or even a swing? Then you're familiar with the force of increased positive G s that make you feel heavier, and multiple negative G s that make you feel lighter. When the force pushing you away from the earth equals the pull of gravity, the net force of gravity on you is zero, or 0 G s. In this condition you feel weightless.

The major obstacle to overcome in achieving powered flight is gravity, which translates into the weight of the proposed aircraft. Gravity works on aircraft as well as human bodies, constantly pulling both back to earth. To overcome gravity, counterforces



Figure 3-1
The four
aerodynamic
forces

must be placed on the proposed aircraft. The first of these counterforces is called *thrust*.

Thrust

To overcome gravity and get an F-16 into the air, thrust of some kind is placed on it. Thrust on a human may be just the muscle action required to leap into the air. For an F-16, thrust is provided by a jet engine.

To remain airborne, however, thrust must be maintained. The muscle action that allows us to leap up cannot be maintained: thrust ceases and gravity reasserts itself, pulling us back to earth. A jet engine can maintain thrust so long as its fuel lasts, and this makes powered flight possible.

Jet engine thrust is not yet controlled flight. By itself, thrust is a rocket ride upward until the fuel is exhausted, or until the aircraft rises so far up that it leaves the pull of the earth behind and goes into space. To achieve control, powered flight requires a second counterforce to gravity, called *lift*.

Lift

Lift is a force caused by the difference in air pressure above and below the wing. Higher pressure below of the wing pushes it upward, lifting it against the lower air pressure on top of the wing. The upward force of lift opposes the downward pull of gravity: with enough lift, the weight of the wing (caused by gravity) is overcome and the wing stays airborne.

The pressure differences above and below the wing are caused by two factors: the airflow passing the wing and the shape of the wing. Airflow is partially controlled by thrust. The engine propels the aircraft forward, forcing air to flow above and below the wing.

The shape of the wing determines the relative speed and smoothness with which air moves over the two sides. A properly designed wing makes air flow faster over the top of the wing, by causing it to strike the top less. This creates lower pressure on top of the wing. Wing design makes more air strike the bottom of the wing, creating higher pressure. The pressure difference results in the force of lift, pushing the aircraft up, counter to the pull of gravity.

Lift makes flight possible. If the aircraft is designed properly, the wings and engines provide sufficient lift to keep the weight of the entire aircraft, crew, and cargo flying.

Lift decreases as you reach high altitudes because the air is thinner. To maintain a minimum of lift as you go higher,

ever-increasing amounts of air must flow over the wings. For this reason, aircraft that fly at very high altitudes must be relatively light and have powerful engines to create enough thrust to maintain sufficient airflow and lift. The F-16's weight, thrust, and lift are not suitable for flying at high altitudes.

Although thrust and lift make flight possible, they also trigger a new force opposed to their action, called *drag*.

Drag

Drag is the wind resistance encountered by the aircraft as it is thrust through the air. Think of it as friction caused by movement through the atmosphere. Molecules of air retard the movement of the wing, as molecules of water push against and slow your hand when you move it below the surface. In general, drag opposes thrust in the same way that gravity opposes lift.

However, drag is relatively constant. Going faster does not appreciably increase drag. Therefore, when the aircraft is horizontal, more thrust results in increased forward velocity. This in turn means more airflow and greater lift.

Drag can be heavily influenced by the shape of the aircraft. Blocky shapes suffer greater drag. For this reason, most aircraft have sleek, curved surfaces intended to reduce drag as much as possible. Every reduction in drag means better speed and more efficient fuel use. The F-16's drag is temporarily increased by carrying bulky air-to-ground weapons, having the landing gear down, having flaps down, or by having the air brakes on. All of these conditions make the F-16 less sleek, thereby increasing wind resistance and slowing it down. There are times when this is desirable.

Temporarily increasing drag can help you slow down quickly. This is useful when adjusting airspeed on a landing approach or a bombing run. During a dogfight, keeping speed up is usually a priority. But a sudden drop in speed may force an enemy on your tail to fly past, giving you a chance to get on his tail.

Drag, like lift, decreases at higher altitudes: because the atmosphere is thinner, fewer air molecules in the air resist the motion of aircraft. This helps light aircraft keep up the high speeds required to maintain lift at high altitude.

Turbulence

Turbulence interrupts the smooth flow of air over a plane's wings. This temporarily disrupts the pressure differences that maintain lift and can mean sudden altitude changes—a sudden gust of wind can throw an unwary pilot into a tailspin. In addition, smooth

airflow is necessary for the F-16's ailerons to work. In *Strike Commander*, joystick movements are converted into slight movements of the ailerons and elevators, which in turn result in climbs, dives, and turns. Ailerons and elevators operate properly only if the airflow over the wings is smooth.

Turbulence commonly results from strong, varying winds that temporarily change the pressures above and below wings. It can also result from having the wing placed at too open an angle into the wind or from flying at an extremely high airspeed. Wings are designed to operate within certain limits of altitude and speed. Going too fast or flying too high may increase turbulence to the point that lift falters or flight control is lost.

In *Strike Commander*, many of the dangers of turbulence have been eliminated. You won't encounter any winds that can buffet you around in the sky by interfering with lift. Regardless of your speed, turbulence cannot become an issue. But turbulence can be a problem during a stall, as discussed below.

Climbing

To increase the altitude of your F-16, increase the lift. Lift is typically increased in two ways: (1) by changing the wing's angle of attack into the wind, or (2) by increasing the thrust. Increasing thrust increases airspeed by forcing more air over the wings, thereby putting increased pressure on the bottom of the wing.

A third, radical way to increase altitude is the *ballistic climb*, which takes you straight up.

Airspeed and Lift

The amount of lift generated by airflow varies with the speed of an aircraft. The faster the plane is pushed forward, the faster the airflow, the greater the pressure difference, and the greater the lift. If an aircraft is in level flight, increasing the airspeed increases lift, causing a gradual increase in the plane's altitude, even though it continues to fly level.

Wing Angle of Attack

The amount of lift generated by the wings of the F-16 can also vary depending on the angle at which the wings are set relative to the airflow. This is the *angle of attack* of the wings, which is determined by the *pitch* of the aircraft.

When the F-16 pitches up, the pressure on the bottom of the wing increases because more of the wind is striking the underside. Pressure on top of the wing decreases because more of the

wind is blocked from striking it. The first result of pitching up is an increase in lift and an increase in altitude, or climbing.

The second result is a decrease in speed, because the increased angle of the wing means more wing surface is faced into the air and drag is increased. If you don't compensate for increased drag by increasing thrust, your aircraft loses airspeed when the angle of attack of the wings is increased.

The advantage of increasing the angle of attack into the wind is that you gain altitude much faster than if you simply increase thrust while flying level. If you need to climb quickly, then pull back on the stick.



If the angle of attack into the wind becomes too large, the aircraft may stall. (Stalls are discussed later in this chapter.)

Pitch

Pitch is the rotation of the aircraft around an axis stretching from wing tip to wing tip. Pitch is either level with the ground, nose down and tail up, or vice versa. The current pitch of your F-16 can be read off the heads-up display (HUD) by noting where the Pitch Ladder is relative to the center of the HUD. Look for the dot in the center of the HUD and the rung of the ladder next to it. If the Pitch Ladder shows a positive number, as in Figure 3-2,



Figure 3-2

Positive pitch of 10 degrees

the aircraft has a positive pitch. In Figure 3-2, the F-16 has a positive pitch of approximately 8 degrees. In this case the angle of attack into the wind is positive and the aircraft is climbing.

The first impulse is to attempt to read the pitch relative to the Velocity Vector Indicator (VVI). This is not a good habit, although it is correct when the F-16 has stabilized, even during a climb. At other times, the VVI can be high or low on the HUD, or off it entirely when the F-16 is making a maneuver.

Consider this example: pitch up 60 degrees and cut the throttle until airspeed falls to zero. Your F-16 stalls and the VVI falls off the bottom of the HUD because the F-16 is falling straight down, tail first. The current flight path is down (which the VVI is attempting to show), although the nose of the plane is pointed up. The pitch remains at roughly 60 degrees because the aircraft is still pointed upward at that angle. You obviously cannot read the pitch by referencing the ladder to the VVI when that indicator can't be seen.

Controlling Pitch

Pitch is controlled by the joystick. Pulling the joystick straight back raises the nose of the aircraft, giving it a positive pitch. Pushing the joystick straight forward lowers the nose of the F-16, giving it a negative pitch. Pitch is zero in level flight.

Your joystick commands are electronically relayed to ailerons on the wings that temporarily change the shape of the wing so that the airflow forces them into the angle you wish. This happens so quickly that plane seems to respond immediately to your joystick.

You can see this by pressing the **[F6]** key and going to the External Camera view. The External Camera is discussed in Chapter 4. For now, watch the pitch of the F-16 from this camera as you alternatively push and pull on the stick. Press the **[F1]** key to return to the cockpit view.

You can also watch changes in pitch from the Chase Camera by pressing the **[F2]** key. However, this camera view maintains the same perspective to your plane, above and behind you, so the changes in pitch are not as easy to see.

The Ballistic Climb

The most direct way up is straight up, and the F-16 has enough thrust to go ballistic for several seconds. Pull back on the stick until your pitch is nearly 90 degrees and punch the afterburner to

full power by pressing the [O] key. You can climb rapidly like this only briefly, but you gain altitude very quickly. As you notice your airspeed begin to drop, prepare to reduce the pitch. When the airspeed begins to drop rapidly, push the stick forward and reduce the throttle.

If you don't pull the F-16 out of a ballistic climb quickly enough you could stall (more on that later in this chapter).

Diving

Diving, or descending, is the opposite of climbing. While in level flight, a reduction in airspeed reduces the airflow. This in turn reduces the pressure differences on the wings, reducing lift. The aircraft begins to descend, even though it continues flying level. In real life, if the throttle is cut while an aircraft is in level flight, the altitude readings on its HUD fall as the aircraft loses altitude. In *Strike Commander*, however, the flight model is not subtle enough to show this.

If you pitch down, the angle of attack into the wind becomes negative. Now more wind is striking the top of the wing than is striking the bottom. Lift is decreased and the aircraft begins to dive, or move downward.

Pitching down also increases your airspeed because thrust is increased by an additional downward component provided by the pull of gravity. As you continue to dive, airspeed accelerates as gravity works with you, not against you. Because of this, pilots refer to being at a high altitude as *having energy*: altitude can be converted into speed (energy, in other words) by diving.

To see this, pitch your aircraft down slightly without changing the throttle. As you begin to dive, watch the airspeed indicators on the HUD as they report your airspeed as increasing.

Level Flight

To fly level, you must achieve an equilibrium of the four aerodynamic forces. The first step is to determine the airspeed at which you wish to fly. For any given airspeed, you can adjust the angle of attack of the wings to provide just enough lift to counteract gravity and maintain altitude.

To achieve level flight, first get the wings flat and set the throttle as you wish. When the airspeed eventually begins to stabilize, raise or lower the nose of the F-16 by pulling back or pushing forward the joystick until the velocity indicator comes to rest exactly on the 0 degrees pitch line of the Pitch Ladder. Notice that

level flight requires intermittent adjustment. Figure 3-3 shows an F-16 in level flight. Note the Velocity Vector Indicator position on top of the 0 degree pitch line.

Turning

Most aircraft turns are banking turns. A slow, wide turn can be accomplished by a slight roll of the aircraft (see below) and a slight pull on the stick. A tighter and faster turn requires a larger degree of roll and a stronger pull back on the stick. All banking turns require some pull on the stick to keep from losing altitude. All banking turns bleed off some airspeed unless thrust is increased to compensate.

To turn only slightly while in level flight, use the rudder to yaw (for more on this, see Rudder Turns on page 45).

Banking Turns

Banking turns are caused by putting your aircraft into a roll. The aerodynamic forces change when an aircraft rolls and the new relationship between them begins to turn your aircraft. However, the changes in aerodynamics also reduce lift, causing your aircraft to begin losing altitude. To maintain altitude you must pull back on the stick, against the pull of gravity. The effect of this is to feel an increase in the *G* forces pulling down on the plane. Pulling back on the stick also increases air resistance (because of the new wing angle of attack) and drops airspeed.



Figure 3-3
F-16 in level flight

Therefore, to maintain airspeed and altitude during a turn, pull back on the stick, accepting some *G* force pressure, and increase your throttle.

Roll

Roll is the rotation of the aircraft around an axis from the nose to the tail. When a plane rolls, one wing goes up and the other down. The direction of the roll is determined by the low wing. For example, in a left roll, the left wing dips down and the right wing comes up. To make your F-16 roll, pull the joystick directly to the left for a left roll or to the right for a right roll. Figure 3-4 shows an F-16 in a left roll, as seen from the Chase Camera.

Alternatively, go to External Camera view (press the **[F6]** key) and watch as you move the joystick to the left, and then to the right. You can clearly see the wings roll up and down in response to your joystick commands.

The aircraft turns in the direction of the roll. The degree of roll inclination and the amount of pull on the joystick determine three things about the turn: how fast you turn, how much altitude you lose or gain, and how much airspeed you lose or gain.

The Effect of Roll

A slight roll changes the force of lift on the aircraft. In level flight, lift pushes the aircraft up, away from the ground, because lift is a force perpendicular to the wing. When the wings are rolled, part of the lift force is converted into a turning force, pulling you to



Figure 3-4
F-16 in a left roll

the left or right. Because the wings are no longer parallel to the ground, part of the lift perpendicular to the wings is now pushing the wings into the turn while the remainder continues to lift against gravity. The turning force is determined by the degree of roll inclination. The steeper the roll, the more lift force is converted into turning force and the less available it is to counteract gravity.

The reduction in lift caused by conversion into the turning force means that the aircraft begins to descend as well as turn. The force of gravity is not affected by the roll and continues to pull down with the same force as when the plane was level. The combination of reduced upward lift and steady gravity works to pull the aircraft toward the ground.

You can see this by putting the F-16 into a slight roll. Do not pull back on the stick. Watch the HUD Direction Tape begin to revolve, indicating that your heading is changing toward the direction of your roll. Also, watch as your altitude begins to decrease.

Compensating for Loss of Lift

Pulling back on the stick can compensate for lift that is lost in a roll. Pulling on the stick changes the angle of attack of the wings, increasing their lift. More air pushes against the bottom of the inclined wings. The amount of stick pull determines whether the aircraft stays level in the turn, or gains or loses altitude. To stay level in a banking turn, you must pull back just enough to compensate for the loss of lift due to the turning force.

Figure 3-5 shows the HUD of an aircraft in a banking turn, where the stick is being pulled back just enough to compensate for lack of lift. Notice that the zero line of the Pitch Ladder in Figure 3-5 remains centered on the HUD, indicating that the aircraft is maintaining its altitude despite the turn. Also notice that the Pitch Ladder has rotated to indicate your degree of roll. The Pitch Ladder is always oriented directly perpendicular to the horizon. Its angle of rotation indicates how much the F-16 has rolled.

Figure 3-6 shows the same aircraft from the Chase Camera view. From this view you can clearly see the roll of the F-16 and the slight pulling up of the wings to maintain altitude.



A common error of new pilots is to overcompensate on the joystick when trying to maintain altitude in a turn. In many turns, the required amount of back pressure on the stick is relatively slight. Overcorrecting pulls you into a climbing turn or a loop in extreme cases.



Figure 3-5

The HUD showing a level banking turn

The increase in lift force caused by pulling back on the joystick in a turn is measured in Gs. The tighter the turn, the greater the number of Gs that the pilot must experience (*or pull*) to maintain altitude. As a *Strike Commander* option you may turn off the effects of G forces (as explained in Chapter 6; the effects of G forces are discussed more fully in Chapter 14).



Because the flight models of Strike Commander are so realistic, there is another option for compensating for altitude loss in a turn: hitting the rudder opposite the turn to help compensate. For example, when turning slightly to the left, pushing the right rudder may provide enough extra lift to keep any altitude loss to a minimum.



Figure 3-6

The Chase Camera view of a level banking turn.

Loss of Airspeed in Turns

Pulling back on the stick to maintain altitude during a banking turn has the effect of reducing airspeed in the same manner that climbing does. Increasing the angle of attack of the wings increases drag and reduces speed. More wind is pressing against the wings now to push you upward.



The steeper the degree of roll, and thus the turn, the greater the joystick pull needed to compensate, and the greater the loss of airspeed. It is quite possible to put yourself into a stall when turning very tightly at a relatively low airspeed. This is a serious hazard during landings, when you are too close to the ground to recover.

To maintain sufficient airspeed in an extended tight turn, you may have to increase your throttle, perhaps to full afterburner. Diving into a tight turn is another way to maintain airspeed. The speed built up in the dive can carry you through the turn.

To see the loss of airspeed in a tight turn, roll up to an inclination of roughly 60 degrees or more and pull back on the stick enough to maintain your altitude. Watch your airspeed drop in the HUD readouts as you continue the turn. See if you can keep up the airspeed by increasing the throttle.

Rudder Turns

When flying roughly level, it is possible to change the heading of your aircraft slightly by hitting the rudder. This movement is called a *yaw*, the left or right rotation of the aircraft within a geometric plane formed by the two wing tips and nose. This allows some course correction without the disruption and compensation required in a banking turn.

To make an adjustment in yaw, press the  key to turn slightly to the left or the  key to turn slightly to the right. You may need to press and hold down the key for a few seconds to achieve the amount of course correction you want. If you overshoot the desired heading, press the other rudder to bring you back. Alternating rudder keys eventually gets you to the correct heading.

Sometimes using the rudder to make slight turns is especially helpful. Rudder turns are useful during landing approach and when lining up a bombing run. Using the rudder does not cause any change in altitude or airspeed. All changes in relative motion are confined to the single dimension of left or right. The rudder is also useful when trying to line up the Waypoint Caret closely with the Current Heading Tic on the HUD.

Practice using the rudder to make heading adjustments when flying toward an object or terrain feature. Note how easy it is to

maintain level flight for F-16 while still being able to make slight course changes.

The Energy Advantage

Pilots speak of having an energy advantage in combat or of having the energy to perform a maneuver. Here, energy is a combination of the kinetic energy of speed and potential energy of altitude. To perform maneuvers in flight, you need sufficient energy from either speed or gravity to provide the lift the movement requires. Maneuvers that involve turns and climbs bleed off speed as they are executed. If you are not moving fast enough when you start the climbing or turning parts of a maneuver, you could stall or be forced to abort the movement.

Having the energy advantage usually means being at a higher altitude, because the potential energy of being high up can be converted into speed by diving. As you dive, gravity works with you to increase your speed. The increased speed from the dive makes it possible for you to carry out tighter turns and climbs more quickly than you could if you started without a dive.

From the higher position, you give up height to increase speed to make tighter turns than a lower opponent can make, giving you the chance to outmaneuver your opponent and move into a shooting position. To match your turning ability, the opponent can gain speed only by diving down further—but he can't dive forever.

Because of this consideration of energy, pilots in a dogfight always try to attain a height advantage over opponents. The pilot with the energy advantage dictates the action and can force the enemy into a defensive posture—forever responding, never initiating.

As the *Strike Commander Technical Supplement* says, speed is life. Even with your afterburner on full power, a series of turns and climbs can reduce your speed dramatically. The only way you can maintain or regain speed quickly is to dive and let gravity help you out.

Basic Flight Maneuvers

There are a few basic maneuvers that a rookie F-16 pilot should be aware of. Some of these are just for fun but most have a definite purpose. Maneuvers discussed in this chapter are the barrel roll, the split S, the Immelman turn, the loop, and the Yo-Yo. More maneuvers are discussed in Chapter 14.

To experiment with these maneuvers, start a search-and-destroy training mission but don't load any weapons. Once in the air, ignore ground targets and practice these maneuvers until your fuel gets low, or quit the mission when you run out.

One of the best ways to watch your aircraft as you practice maneuvers is from the Chase Camera view, as shown in Figure 3-7. (This camera is discussed more in Chapter 4.) But for now, press the **F2** key to watch your plane from a vantage point behind and above. When you wish to return to the Cockpit view, press the **F1** key.

The Barrel Roll

To perform a barrel roll, put your F-16 into approximately level flight and then push the joystick all the way over to the left or right. One complete rotation of the aircraft in either direction is called a barrel or victory roll. After one rotation is complete, recenter the joystick when the F-16 is once again upright and continue flying level. Pilots that have scored a kill in air-to-air combat traditionally perform a victory roll over their air base before landing.

The advantage of the barrel roll in combat is that you can pull out of the roll into a banking turn, climb, or perform an inverted dive at any moment. An opponent must repeat your maneuver to stay on your tail and you can put some distance between you if he is slow to react. Extended barrel rolls are also a way to reduce speed while maintaining your heading.

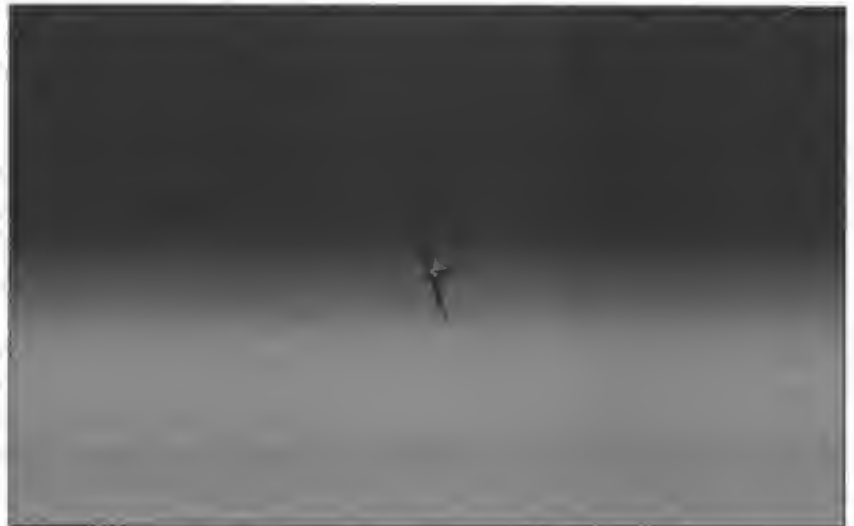


Figure 3-7

The beginning of a barrel roll from the Chase Camera view

The Split S

The split S is intended to reverse your heading 180 degrees and increase speed at the same time. The tradeoff is a loss of altitude.

Begin the split S by flying level or pulling up the F-16's nose slightly. Then do a half roll to either the left or right to put yourself upside down. Pull back hard on the stick, once inverted, to dive. Punch up the afterburner to full power as you start the dive if your level airspeed is less than 350 knots. Then cut it back once you are pointed at the ground to reduce the amount of altitude you are losing. Continue to pull back on the stick until you are level once again and restore your throttle.

The split S takes its name from the shape of the bottom half of the letter S, which the maneuver traces out in execution.

You are now headed in the opposite direction from when you started the split S, and traveling at a higher speed. In a dogfight, you may be able to use this speed to get away from an enemy, or line up a head-on shot.



The split S is a diving maneuver and must be started at some minimum altitude to prevent piling into the ground. Be sure you have several thousand feet of altitude to pull out before starting the maneuver.

The Immelman Turn

The Immelman turn is the inverse of the split S: it also results in a reversal of heading, but gains altitude. The tradeoff is a loss of airspeed.

Begin the Immelman turn from level flight or with the F-16's nose slightly down. Pull back sharply on the stick until you have completed a halfloop and are once again flying level, but inverted. Do a halfroll to return upright. Like the split S, the Immelman reverses your heading 180 degrees. You are now at a higher altitude, but have lost significant airspeed because of the climb.

You may hold the vertical climb in the Immelman turn to continue gaining altitude. However, airspeed drops off quickly while you are vertical. Be aware that it is easy to stall when in the vertical part of the Immelman. You can punch the afterburner while vertical to keep up speed somewhat.

This maneuver is named for Max Immelman, a German World War I fighter pilot credited with its invention. Immelman is reported to have rolled while vertical, allowing him to finish the loop in any direction he desired, not just in reverse of his original heading. Regardless of heading, he still finished the loop inverted.

The Immelman turn can be used to turn about and face an enemy coming at you from the rear. It is also a way to quickly get behind an enemy coming at you head on.

The Loop

The loop is a combination of the split S and the Immelman turn, performed one after the other. The result is a return to your original heading and position. You can start the loop with either the split S or the Immelman turn. If you wish to reduce airspeed, start with the Immelman. If you wish to keep your speed up as much as possible, or don't have the speed to start an Immelman, start with the split S.

The loop can be used to evade an enemy to your rear while ending up on his tail instead. However, if you pull up slowly into the Immelman turn to start the loop, the bogey in your six o'clock position may get off a good shot.



Starting an inverted loop below 2,000 feet risks crashing into the ground. Remember, an inverted loop starts with a split S.

The Yo-Yo

The basic Yo-Yo is a two-part maneuver consisting of a climb up and then a dive down. Before beginning the Yo-Yo, read off your current altitude from the HUD. Starting in level flight, pull back on the stick until you are climbing at approximately 45 degrees. Figure 3-8 shows the HUD of an F-16 in a 45 degree climb. Figure 3-9 shows the same climb from the External Camera view. Watch the Airspeed Tape on the HUD change as your speed decreases during the climb.

After a modest climb of 1,000 feet or less, roll over until inverted and pull back on the stick to pitch down until you are diving at approximately 45 degrees. As you approach the altitude at which you started, roll over upright once again and pull out of the dive to resume level flight. Note that the downward movement of the Yo-Yo is performed inverted to pull positive Gs. It is not performed upright, pushing negative Gs.

The Yo-Yo takes its name from the motion of the toy with the same name, even though the maneuver is more like a roller coaster ride in execution.

The Yo-Yo is primarily used by faster aircraft against slower ones. As you approach a slower plane from the rear, performing a



Figure 3-8

The 45 degree climb to start a Yo-Yo maneuver

Yo-Yo keeps you from passing too quickly and can bring you down with a better shot at the top of the enemy aircraft. The climb sloughs off part of your speed, but you recover your energy advantage in the dive.

Variations of the Yo-Yo include high and low Yo-Yo turns, and the straight pursuit Yo-Yo. These maneuvers are described in Chapter 14.

Stalls

An aircraft stall is known technically as the loss of aerodynamic condition. What's important is that a stalled plane stops flying



Figure 3-9

The Yo-Yo climb from the Chase Camera view

and starts falling. An aircraft stall is not an engine problem, although an aerodynamic stall results when the plane's engines stop working during flight.

As a rookie pilot you don't have to worry about stalls, because stalls are an optional feature of *Strike Commander* that may be turned off or on (as explained in Chapter 6). When the Stalls option is off, they cannot occur, regardless of how you maneuver your F-16.

How Stalls Occur

An aircraft stalls when the positive forces of thrust and lift are overcome by the negative forces of drag and gravity. This happens most commonly when the wing's angle of attack opens too wide and air stops flowing smoothly over the wing. The resulting turbulence eliminates the pressure difference above and below the wing, which eliminates lift. The ailerons and other control surfaces cannot function because of the turbulence. Without lift to counteract gravity, the plane begins to fall out of the sky.

When a stall occurs, turbulence makes joystick controls sluggish or ineffective. The pilot loses control of most flight function, at least temporarily.

The point at which the F-16 will stall depends on many factors, including airspeed, altitude, wing angle of attack, degree of bank, and aircraft weight. The slower your airspeed, the more likely it is for a stall to occur during a maneuver. Stalls are most common during steep climbs or extended tight turns. A tight turn simultaneously reduces your lift and airspeed, and these two factors are the most common cause of stalls. When your F-16 reaches stall speed, the Stall Warning appears on the HUD, as shown in Figure 3-10.

To force a stall, drop your throttle to a low setting and attempt some steep climbs and sharp turns. Putting your F-16 into some intentional stalls lets you practice recovering from them.

Recovering from a Stall

A stalled aircraft is falling out of the sky. It is not aerodynamic, it is not flying, and you have almost no control over it. If you can use the minimum control that you do have, you may be able to point the aircraft downward, so that airflow over the wings is restored. Smooth airflow provides lift and makes it possible to reassert control over the aircraft through the joystick.

Recovering from a stall takes some time. Meanwhile the aircraft falls downward while the dive gradually builds airspeed. If you stall too close to the ground, there won't be time to reestablish



Figure 3-10
HUD Stall Warning

control before impact. In this case, eject by pressing the **[Ctrl] + [E]** keys.

If you stall high enough, the aerodynamic shape of the F-16 eventually reorients it, nose toward the ground. If you are pointed upward when you stall, cut your throttle way back, or even off, so that the engine thrust doesn't interfere with the F-16 getting itself faced nose down as soon as possible.

Once the F-16 is nose down, punch up the throttle or turn it back on to help accelerate the dive to reestablish airspeed and lift. Once you reach an airspeed over 125 knots begin pulling back on the stick to pull out of the dive. At this point you should have built up enough lift and control to establish aerodynamic condition and resume flying.

Practicing Flying

Before attempting any combat, consider doing some practice flying. Load up either type of training mission, but don't concern yourself with any ground attacks or enemy aircraft. If you choose a dogfight mission, make your opponent an unarmed aircraft such as a TU-95 or C-130.

Flight Mechanics

Use practice flying to become comfortable with flying the F-16. Try turns, climbs, and dives, and occasionally jump to the Chase Camera view (by pressing the **[F2]** key) to see how your joystick

commands are translated into maneuvers by the F-16. Try slow turns with light pulls on the stick and then tight turns with stronger pulls on the stick. Notice how each type of turn affects airspeed and altitude.

During climbs, watch your airspeed diminish. Try punching up the throttle to increase thrust, and thus airspeed. During dives watch how your airspeed increases, even during a relatively shallow climb.

Practice both the Immelman turn and the split S. Notice what airspeed is sufficient to get you up and over in the Immelman. Also notice the minimum altitude from which you can safely start a split S without getting too close to the ground.

From level flight, watch the effect of slight turns, dives, and climbs. Try making a 360 degree turn without losing or gaining altitude. Also from level flight, try putting on the brakes or putting down the flaps (press the **[F]** key). Watch the effect of both changes and keep them in mind. There may be times in the future when you want the effect you can get from these controls.

Finally, make sure the Stalls option is turned on and then practice stalling the F-16 and recovering from a stall.

Don't be afraid to crash the F-16 in practice. There is no harm done. Just press the **[Alt]+[O]** keys, then the Exit Game button, and then the Restart button to start the mission over again.

Flying versus Aircraft

Practice first against an unarmed aircraft, such as the TU-95. It does not change course or try to evade until the enemy pilot perceives that he is in danger, which is equivalent to being fired on. So don't fire on the enemy plane until you mean to.

Practice flying with the enemy aircraft. Come up on it from behind and attempt to match its speed. Remember, you can slow down by cutting the throttle or by turning on the air brakes (press the **[B]** key).

Fly over the aircraft and past it, and then perform an Immelman turn or split S to come back at it.

If the game option Midair Collisions is turned on, you may want to attempt crashing into the enemy aircraft. This is a little extreme, but it is practice in controlling flight, of a sort.

After flying against harmless aircraft, try flying against other fighters. Practice avoiding their attacks while you try to gun them down yourself.

Flying versus Terrain

One of the best ways to practice flying relative to terrain is to fly down one of the several canyons found in the training world. This requires a minimum of turning ability and is good experience for getting used to haze effects. When you are flying real game missions, it is important to react quickly to ground targets that pop out of the haze relatively close to you. Canyon flying introduces you to that problem.

Flying “on the deck,” or very close to the ground, is also useful once you get into the game. Take your F-16 down low and skim over the terrain. If you can fly safely at tree-top level, you are ready for strafing with rockets and the cannon. Watch how the terrain rolls and learn how to predict when an elevation is coming up. Learn how to rise up and over ridges and then come back down in the valleys. Decide what airspeed is most comfortable for you at low altitudes, yet still gives you time to spot upcoming targets. Practice using the rudder keys to adjust your approach to ground targets or terrain features.

A good place to practice low flying is Halverston. You can fly between the tall buildings in the downtown area and skim over the supertanker out in the harbor. There are a number of anti-aircraft guns around this city, and this is a good time to see how accurate they are. Fly over them and see what flight paths give them the best chance of hitting you. Then try flying evasively and see if they can hit you.

ORIENTATION IN THE AIR



The next step in your F-16 orientation is a brief introduction to the remaining visible features of the cockpit, other than the heads-up display (HUD). These special features are explained in greater detail in later chapters, where their importance is more relevant.

From the cockpit, we move on to discuss how you can look outside the aircraft to help orient yourself in the air. You learn how to look behind you, to the sides, and above. A number of special camera views are also introduced. These are features of *Strike Commander* that allow you to watch your own actions from some extraordinary perspectives.

Next we discuss how you can determine where you are. You can't perform missions if you can't figure out where you are in the world relative to your base and any mission targets.

To begin this orientation in the air, start another training mission similar to the one described at the beginning of Chapter 2. When the mission starts and the cockpit appears on your screen, pause the game by pressing the **[Alt]** - **[P]** keys.

In the Cockpit

As you look around the cockpit again, note that only three of the features you normally see are of consequence: the HUD, the Threat Warning Indicator, and your Missile Warning Lights, all shown in Figure 4-1. Ignore all of the other dials and toggle switches that you see in the cockpit. They have no game function, although in some cases they appear to be operating. The information they

report is covered elsewhere in the cockpit, either in the HUD or as part of a multifunction display.

After reading Chapter 2, you should be familiar with the HUD. The Threat Warning Indicator (TWI) and the Missile Warning Lights are introduced below. In addition to these three features, there are several others that may be called up as you wish. These are called multifunction display screens, or MFDs, and are discussed in Chapter 5.

Threat Warning Indicator

This circular screen, also known as the RAW Scope, is found below and to the left of the HUD, as seen in Figure 4-1. Your F-16 has a passive radar emission receiver built into its skin that continuously monitors radar signals striking the aircraft's body. These signals may come from aircraft, ground vehicles with radar, radar installations, or ship radar.

Look for an inverted T-shaped icon above and to the right of your Threat Warning Indicator screen. This icon indicates the relative position of the TU-95 bomber that you are chasing.

Different icons on the Threat Warning Indicator represent different radar sources. The icons are faint so long as the radar is searching. If any one of them suddenly brightens, radar has locked on and is tracking you. Gunfire or missiles may soon be headed in your direction.

Your aircraft's position is centered in the RAW Scope. Knowing this, you can make estimates about where the radar source is,



Figure 4-1

Basic F-16 cockpit
features

on the basis of its position on the scope. If you turn to face a threat on the RAW Scope, you can normally pick it up on your own radar. If you can't pick it up on radar, the threat may be behind a mountain.

The RAW Scope may be placed in normal or smart mode. These modes are discussed in Chapter 6.

Threat Icons

Aerial threats are enemy aircraft. Aircraft appear on the TWI as inverted Ts. When you zoom in the Close Cockpit view (press the **[F1]** key), you can see either zero, one, two, or three dots below the base of the inverted T. These indicate the sophistication of the radar and aircraft detected. If no dot is present, this indicates that the aircraft is unarmed. One dot indicates primitive or very old radar, two dots indicate average radar, and three dots indicate very sophisticated radar. Figure 4-2 shows the TU-95 bomber picked up on the TWI with no dot, indicating that it is not armed.

Ground-based missile radar appears on the Threat Warning Indicator as a square. Inside the square is either a dash, the number 2, or the number 6. A dash indicates the radar is not a threat, such as the radar found near runways. You can see this during a game mission when you take off from your own base. In some cases you may see what looks like a skull within a square. This is most often due to several icons appearing on top of each other on the TWI because multiple gun and missile radar sources are close together on the ground



Figure 4-2
TU-95 bomber
spotted on the
Threat Warning
Indicator

The numbers indicate the type of SAM being controlled by the radar, either an SA-2 or SA-6. Often the missiles and radar are separated to make a dispersed target, and the missiles are worthless if the radar controlling them stops working for any reason. If you knock out the radar, the missiles lose their eyes.

Ground-based gun radar appears on the Threat Warning Indicator as a circle. A circle with a dot in the center indicates a stationary 40mm anti-aircraft gun. Again, when radar is present, knocking it out makes the gun stop firing because it has little chance of success. This is true only in *Strike Commander*, however. In the real world gunners would keep firing and attempt to blanket an area with fire. A circle with no dot in the center indicates the presence of a ZSU-23/4 anti-aircraft vehicle mounting 23mm guns. This vehicle mounts both radar and guns together.

If you pick up ground radar threats while over water, there are warships below. Both PT boats and carriers mount 40mm anti-aircraft guns, and appear as a circle with dots. Destroyers carry SA-6s and appear as squares with the number 6 inside.

Tactical Use of the Threat Warning Indicator

The Threat Warning Indicator is one of your tools for locating the enemy and discriminating among potential targets. Remember that your aircraft is at the center of the scope and oriented toward the top. The position of Threat icons on the scope indicates both their direction and distance from you. If you turn toward a threat on the scope, the icon rotates because your position on the scope is fixed in the center. When a Threat icon is at the top of the scope, you are facing it directly, and you can pick it up on either your air or ground radar, whichever is appropriate. Both types of radar are discussed in Chapter 5.

If you see a Threat icon suddenly brighten in color, this indicates you are being tracked by a radar source. By knowing the type of icon that has brightened, you can prepare yourself for appropriate evasive steps. For example, if you are being tracked by gun radar, climb and add speed to reduce the probability of hits.

If several different types of enemy aircraft are showing on your TWI, locate and engage first the one that is most sophisticated, because it is probably the most dangerous.

Of the two types of SAM you can encounter, the SA-6 is newer, has a larger warhead, and does not have to get as close to you as the SA-2 does before detonating. It does not turn as well as the SA-2, but must be considered more dangerous. If you have both

types of SAM batteries on your Threat Warning Indicator, consider taking out the SA-6 battery first.

Missile Warning Lights

Just above the RAW Scope on the instrument panel are two small lights (marked in Figure 4-1). The one to the left is yellow and the one to the right is red. These are Missile Warning Lights that turn on when a missile is tracking you. When either light starts to blink rapidly, the missile is extremely close. If you don't do something to evade or decoy the missile, expect it to hit and destroy your aircraft.

The yellow light indicates an infrared guided missile is tracking you. The red light indicates a radar-guided missile has you locked on. Evading enemy missiles is discussed in Chapter 8.

Looking Around

A real pilot sitting in the cockpit can easily turn to look out to the side, or look up. You can do this too. In addition *Strike Commander* has some special features that give you extraordinary views of the sky and of what is happening around you.

Panning around the Cockpit

Assuming that your game is paused, press any key to resume play. Press the **[2]** key to reduce the throttle and drop your speed. You should soon come up to the TU-95 you are chasing but ignore it for now. If you really must shoot it down, skip ahead to Chapter 9 and read about how to use the cannon.

You can pan around in the cockpit to look out the windows to the side, to the rear, and overhead. Hold down the second fire button on your joystick and pull the stick to the right. This pans your view to the right until you look over your right shoulder to the rear. Figure 4-3 shows the view after panning the Close Cockpit view to the right.

Release the joystick so that it centers, then release the second fire button. This restores the Close Cockpit view, looking to the front of the F-16.



When releasing the joystick after panning, always center the joystick first before releasing the second fire button. If you do this in reverse, releasing the button activates joystick control of the aircraft. If the joystick is not centered, the F-16 goes into an immediate maneuver depending on where the joystick is held.



Figure 4-3

Close Cockpit view
panned to the right

Hold down the second fire button again and pull the stick to the left to pan around to the left. Release the joystick again, hold down the second fire button once more, and pull back on the joystick. This pans your view up over your head. You can also pan down to look into your lap.

Panning is useful when you are sightseeing, checking on your wingman, or looking at something as you fly past. It is also useful when you want to look at the ground. It is difficult to see the ground directly below except during a dive or by rolling over 180 degrees and flying upside down. By rolling your plane up close to 90 degrees (on your side) and panning toward the ground, you can see objects you are flying over without the extreme disorientation of flying inverted.

While you are panning, your joystick no longer controls the pitch and roll of your F-16. Your aircraft continues flying according to the signals it was receiving before panning began. Remember, as long as you hold down the second fire button, the joystick does not control flight.

Also, note that while you are panning the HUD disappears. The HUD can only be seen from the Close Cockpit view (**F1**).

Looking Left, Right, or Rear

As alternatives to panning around to look out to the sides, rear, or above, *Strike Commander* includes some specific camera views that turn your head immediately. Press the **F3** key to look left, the **F4** key to look right, and the **F5** key to look to the rear. In

the same manner as panning, you can use the left and right views to look at the ground as you roll.

Press the **[F1]** key to return to the front view of your cockpit.

Chase Camera View

Press the **[F2]** key to jump to the Chase Camera view. The perspective of this view is that of a camera behind and above your aircraft (see Figure 4-4). There are times during play when it may be useful to jump to this view to better understand what is going on. The Chase Camera view can be useful when you are attempting to land or take off, or just sightseeing. It is generally dangerous to be in the chase view for extended periods during combat because you are not aware of the status of your weapons or of the proximity of danger.

Determining Where You Are

It's easy to become disoriented in the sky and lose track of where you are. This can be deadly at low altitudes or near mountains because of the risk of crashing. You can also easily lose track of where you are in the world. As an F-16 pilot you are generally in the air for a purpose. To fulfill the mission assigned, you need to know where you are, where you are going, and how to get there.

There are three main sources of information available to help determine your position: what you can see through your windscreen from the Close Cockpit view, what the HUD is



Figure 4-4
Chase Camera
view

reporting, and your NAV map. The cockpit view may be the least useful because it is so restricted.

Several parts of the HUD are designed to help you understand quickly where you are in the sky. From the altitude displays you can tell at a glance how high you are. The Pitch Ladder can help you understand whether you are climbing, diving, or flying level. The Velocity Vector Indicator shows whether you are in stable flight or not.

The Direction Tape, Current Heading Tic, and Waypoint Caret can be useful in determining your position, especially when consulted along with your NAV map. The NAV map is the most important source of information regarding where you are in the world.

Navigation Map Display

The Navigation Map display, or NAV map, is an interactive map of your mission world. It shows all relevant points of interest and a topographic view of the region. The NAV map for the training mission world is shown in Figure 4-5. It is oriented north-south from top to bottom to allow the plotting of crude course headings. At the NAV map you set your waypoints and change them as you wish. Waypoints are discussed later in this chapter.

You can access your NAV map from the cockpit at any time by pressing the **[N]** key. To close the NAV map, press the **[N]** key, the **[Enter]** key, or **[Esc]** key.

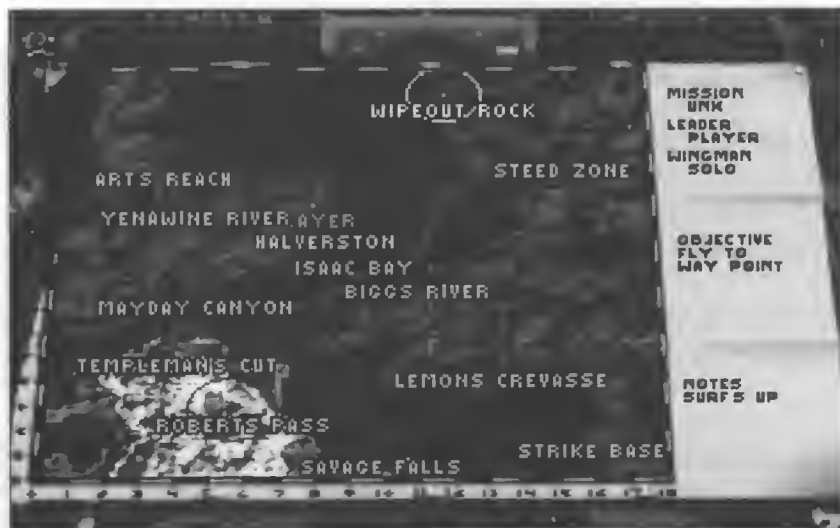


Figure 4-5
Training mission
world NAV map



*Be careful not to press the **[Spacebar]** key to close the NAV map, because it is a fire button. If you are in a weapon mode, pressing this key fires the weapon, even though you are at the NAV map. In this instance you do close the NAV map, but it may be a very expensive and wasteful way to do so.*

Description

The NAV map is square and in color, and shows the world of your current mission. You may not fly off the edge of this world map. The map distinguishes water, land, mountains, rivers, and other significant geographic features. Areas of the map that are potentially important to your mission are named, mostly in green letters. There is always one location that is circled and with its name in white letters. The name in white letters designates your current waypoint. In Figure 4-5, the current waypoint is set for Wipeout Rock.

The current location of your F-16 is always marked on the NAV map within a circle, as seen in Figure 4-5. The circle around your location can be useful when you are setting headings. Think of the circle as a compass with magnetic north at the top of the circle. Then you can estimate the heading to set to reach any location on the map. For example, if you are over Halverston on the training mission map and wish to fly toward your Strike Base but not make it your waypoint, make an estimate of the heading from Halverston to the base, say 140 degrees, and fly on that heading.





The locations of other friendly and enemy aircraft known to be present are also marked with a name and circle.

Along the right-hand side of the NAV map, you can read information regarding the status of your mission. This includes the type of mission you are on, the leader of the mission, the name of your wingman (if one is present), the objective of your mission, and any notes that might be relevant.

Waypoints

Waypoints are an aid to navigation. Setting a waypoint marks a location on the NAV map as your immediate destination. Once set, the current waypoint determines the position of the Waypoint Caret on the HUD, which in turn helps you set a heading that directs you to that position in the world. The waypoint also tells the autopilot where to take you, if called on (see the discussion about the autopilot on page 64).

Whenever you begin a new mission of any kind, a waypoint is automatically set. This waypoint is based on either the mission you selected or the premission briefing. This preset waypoint is noted on your HUD by the Waypoint Caret before you take off. You can check where the waypoint is set by opening the NAV map. The current waypoint is designated by having its name in white letters. Waypoints that you have already reached are marked with their name in yellow letters.


The current waypoint can be changed at the NAV map. Once the map is open, press Arrow keys to cycle through the available destinations. The  and  Arrow keys cycle up the list of potential waypoints, and the  and  Arrow keys cycle down the list of destinations. The Arrow keys in the numeric keypad work as well. You can also use your joystick to change waypoints, by pulling it down or pushing it up. With each keystroke, the waypoint changes and the newly selected one is highlighted with its name in white letters. When the waypoint you wish is selected, exit the NAV map. This sets the new waypoint.

For example, the possible waypoints on the training mission map are listed in order below.

- Halverston
- Wipeout Rock
- Roberts Pass
- Yenawine River
- Mayday Canyon
- Biggs River
- Templemans Cut
- Savage Falls
- Arts Reach
- Isaac Bay
- Steed Zone
- Lemons Crevasse
- Strike Base

You can work your way down the list or up, using the Arrow keys or joystick, but the list does not wrap around. If you go past the last location at either end of the list, then no waypoint is highlighted. However, when you return to the cockpit, either Halverston or Strike Base has been selected as your waypoint, depending on which end of the list you went off.

The Autopilot

Using the autopilot is a quick way to travel around the world. To activate the autopilot, press the  key. Your aircraft immediately

travels from its current position in the world to your waypoint location. You see a brief animation of your F-16 in flight, and then you are there. Fuel and time are expended when using the autopilot. Its main value is that the transit is almost immediate, saving you playing time.

When you use autopilot to fly to your waypoint, you may not arrive at an altitude, airspeed, heading, or local location that you might prefer. You may have to make some quick adjustments in your flying when you come out of autopilot. For example, if you use autopilot during a training mission to return to your Strike Base for landing, you come out of autopilot high above the runway. You won't be able to go in for a landing without some circling, unless you are an expert pilot. In many game missions, you can come out of autopilot at a tactical disadvantage, in the middle of a swarm of enemy aircraft.

If it is critical how you approach your waypoint, it may be preferable not to use the autopilot. You can approach the waypoint by normal flying and speed up the passage of time if nothing is happening. Time compression is discussed in Chapter 6.

Camera Views

The designers of *Strike Commander* have built into the interface several camera views unavailable to real pilots. These views allow you to follow the action from a number of interesting perspectives, as if a camera were placed strategically outside your aircraft to film the action. When a camera view is on, you are in effect watching a live video feed of what you are doing as you do it. Some of these camera views can be set to turn on and off automatically at an appropriate time, and others must be turned on or off manually. Being familiar with the point of view of the cameras, knowing how to get to them quickly, and knowing when best to call for them greatly enhances the enjoyment of *Strike Commander*.

From some of these views you may pan around by holding down the second fire button and pulling the joystick in various directions. Release the joystick first, and then release the second fire button to return the view to its normal angle.

Also, from some of these views you may zoom in and out. Press the **[I]** key to zoom in and the **[O]** key to zoom out.

Be aware that your HUD is not visible from camera views, with the exception of the cockpit view. This means that you are flying without instruments. This can be a severe handicap during combat. Remember that you can quickly restore the Close Cockpit view and HUD by pressing the **[F1]** key.

Close Cockpit View

The Close Cockpit view is the standard front view that you look at most often. This is the only view that shows the HUD. The Close Cockpit view is triggered by pressing the **[F1]** key. If you are already in this view, pressing the **[F1]** key again zooms the view in and out.

As a game option you may turn on the Auto-Switching option (as explained in Chapter 6). When Auto-Switching is on, you immediately jump back to the Close Cockpit view if you are in danger of crashing into the ground, or if you have become damaged or stall.

Chase Camera

The Chase Camera view is taken from above and behind your aircraft. You saw it earlier in Figure 4-4. This view is often useful or interesting when landing or taking off. It can be an interesting perspective during ground attacks, but you have little chance of hitting anything without the targeting aids found on your HUD. You cannot pan from the Chase Camera, but you can zoom.

Left, Right, and Back Cockpit Cameras

The Left, Right, and Back Cockpit Cameras allow you to quickly look to the left, right, or back of your cockpit, as discussed earlier in this chapter. Press the **[F3]** key for the left cockpit view, the **[F4]** key for the right cockpit view, and the **[F5]** key for the back cockpit view. You cannot pan from these three cockpit views.

External Camera

The External Camera is a view from outside your aircraft and at the same level. Press the **[F6]** key to turn on this camera. Now hold down the second fire button and pull on your joystick to pan around your F-16. You can zoom in and out with this camera, using the **[I]** and **[J]** keys. Figure 4-6 shows the External Camera view of the F-16.

Press the **[F6]** key again to see the next closest aircraft in the sky. If the TU-95 is still around from your training mission, it pops into view, as shown in Figure 4-7.

If you press the **[Ctrl] - [F6]** keys instead of the **[F6]** key, you activate an External Camera view of the nearest ground target. By continuing to press the **[Ctrl] - [F6]** keys you cycle through all available ground targets. You can pan around ground targets with this camera, and zoom in and out as well. For more information on using the camera, see Chapter 11.



Figure 4-6
External Camera
view of the F-16

Player-to-Target/Target-to-Player Camera

This camera is placed either behind your aircraft, so that it is looking at your radar-designated target, or behind the target looking at you. Press the **(F7)** key to activate the Player-to-Target camera. When first turned on, this view shows your aircraft in the foreground and your target in the distance. Figure 4-8 shows the F-16 in the foreground and the TU-95 to the rear.

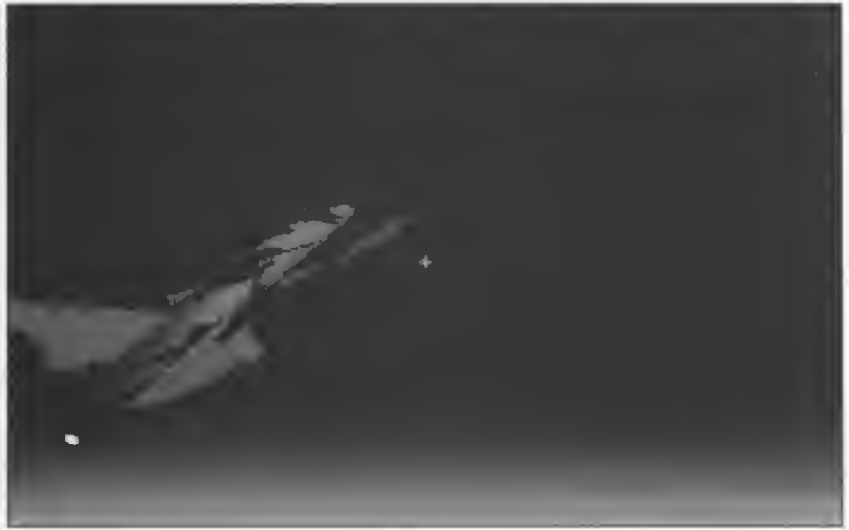
Press the **(F7)** key again to reverse the view, so that it projects from behind your target toward you. Figure 4-9 shows the



Figure 4-7
TU-95 in the External
Camera view

Figure 4-8

Player-to-Target
view of the TU-95

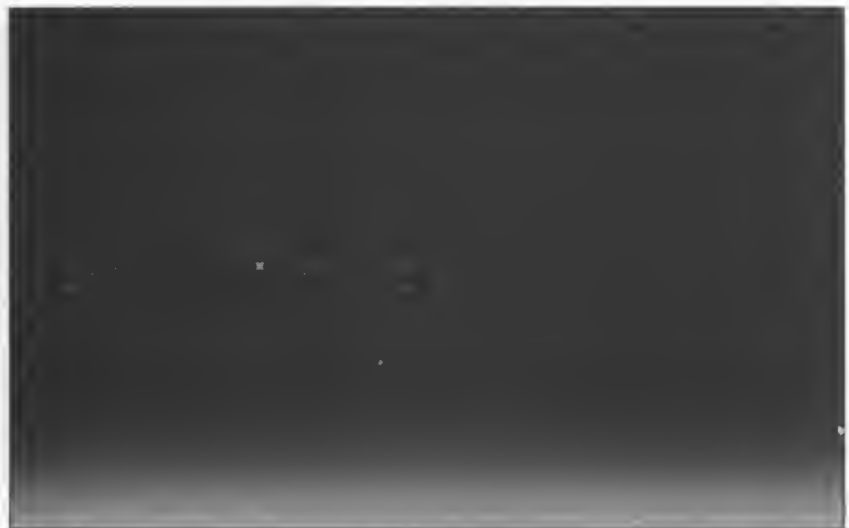


TU-95 in the foreground. The position of the F-16 is marked by the glint of light because it is behind the bomber and out of view. The glint of light appears directly on the bomber.

This camera is especially useful in air-to-air combat. It is quite easy to lose track of an enemy's position in a dogfight, especially if you are not using the optional 360 Degree Radar and Smart RAW Scope (both of these features are discussed in Chapter 6). Even when you have a good idea where the enemy is, it may be

Figure 4-9

Target-to-Player
view from the TU-95
to the F-16



far from clear how to close in again. The Player-to-Target Camera can help.

When you lose sight of an enemy, activate this camera. You can quickly see where the other aircraft is in relation to yours, and decide how best to get back into shooting position. You can stay in this view while you maneuver and watch as your aircraft responds to joystick commands. Once pointed in the right direction, you can press the **[F1]** key to return to the Close Cockpit view and get ready to use your weapons.

Weapon Camera

The Weapon Camera allows you to watch the flight of all weapons except the Vulcan's cannon rounds. (Vulcan cannon rounds can be seen directly to the front through the windscreen, so there is no need for a camera view.) When you have loosed a weapon and the Weapon camera is on, it follows the path of your weapon, riding along and watching from the rear, until the weapon hits a target or misses clearly.

Figure 4-10 shows the Weapon Camera following an AIM-120 missile toward a TU-95 bomber. Toggle the Weapon Camera on and off by pressing the **[F10]** key. Alternatively, preset the camera from the Game Options menu to come on automatically, as explained in Chapter 6.

Presetting the Weapon and Victim Cameras together adds significantly to the entertainment value of *Strike Commander*. By



Figure 4-10

Weapon Camera
following a missile
toward a TU-95
bomber

presetting them you don't have to bother with pressing the right keys at the right time to catch the action. Let the program do the work.



*When the Weapon Camera is on, the HUD is not visible and you are blindly controlling your aircraft. You cannot switch targets, and firing weapons blind is probably a waste of munitions. This can be a handicap in a dogfight against several opponents or during a bombing run when you wish to hit several targets on the same pass. Be prepared to press the **[F1]** key and return to the Close Cockpit view, foregoing the fun of watching your weapon home in on its target. You may need to pick up a new target quickly and get ready to fire again, long before the Weapon Camera runs out of footage.*

While the Weapon Camera is rolling you are basically just watching television: the camera follows a missile or bomb all of the way to the target, usually taking a lot of flight time. In the meantime, your F-16 is continuing to fly on.

For example, if you set up a training mission with three TU-95s and closed on them from behind, you probably could shoot down only one, using the AIM-120 missile with both the Weapon and Victim Cameras on. By the time these cameras film all of the action of your first missile being launched, flying to the target, the impact, and the plummet of the stricken TU-95, you have flown past the other TU-95s and must circle to set up another shot.

As an alternative for this example, press the **[F1]** key to restore the Close Cockpit view after the first missile is underway. From here you can acquire another target and quickly get a second missile away before the first even hits. For more information on changing and acquiring targets, and firing missiles, see Chapter 8.

Victim Camera

The Victim Camera provides a close-up view of your target when your weapons hit. The Victim Camera is toggled off and on manually by pressing the **[F9]** key, or it may be preset to come on automatically when appropriate. Preset the Victim Camera from the Game Options menu as explained in Chapter 6.

The Victim Camera is one of the special game features of *Strike Commander*, and if you don't use it you are missing something. As a new player, make it a habit to preset at least the Victim Camera and possibly the Weapons Camera as well. Then, when you fire a weapon, say an air-to-air missile, you get to ride along with the missile to the target (the Weapon Camera) and see the

impact of a successful hit (the Victim Camera). The program automatically controls when the cameras come on and go off to give you the best view of the action. You just sit back and watch.

The Victim Camera stays on the target after impact for a few seconds and then returns to the Close Cockpit view. The Victim Camera is one of the many small payoffs in *Strike Commander* that add up to a very entertaining game.



*When the Victim Camera is on, the HUD is not visible and you are blindly controlling your aircraft. Be prepared to press the **[F1]** key and return to the Close Cockpit view, as soon as the camera confirms that your weapon has hit.*

The Victim Camera is a key tool during combat for confirming that targets have been hit. When the Weapon Camera is off, the automatic switch to the Victim Camera when a weapon hits is the only way to be sure that you have hit. For many weapons, a hit means destruction. You can watch this camera view for an instant to be sure that the target is destroyed and then quickly return to the cockpit.

Without the Victim Camera, you must somehow watch the target and confirm it is hit. This is very difficult, especially when you are under attack yourself or busy lining up new targets. The Victim Camera is the quickest and easiest way to confirm hits. Just be ready to hit the **[F1]** key quickly to get back into the cockpit. New pilots should have it preset to turn on automatically.

Auto-Target Tracking Camera

The Auto-Target Tracking Camera can be very useful in a dogfight because it helps you keep watch on where your opponent is and what he is up to. In fighter pilot parlance, this is called maintaining “situational awareness” or “SA.” The Auto-Target Tracking Camera makes it easier for you to remain aware of your enemy and maneuver your aircraft into a shooting position.

To use this camera, you must have a target selected. (See Chapter 7 for a discussion on how to select a target). When the selected target passes out of sight from the Close Cockpit view, press the **[Y]** key to turn on Auto-Target Tracking. A message appears at the top of the HUD, reporting EYES LOCKED ON TARGET to let you know the camera is on. However, even though the camera is on, you may have to help it operate.

When your selected target is out of sight, the diamond-X symbol appears on the HUD to indicate the best direction to turn to repoint your F-16 toward the target. If you turn your

aircraft in this direction, the Auto-Target Tracking Camera takes over and pans your view around until the target is once again visible. Keep your aircraft turning toward the target by pulling on the stick and rotating it so that the target is toward the top of the screen. So long as you continue to pull toward the target, the camera holds it in view.

If you can bring the F-16 around, your front windscreen comes into view. This restores the Close Cockpit view and you can once again use the HUD.

If you don't turn your F-16 in the direction of the target, the Auto-Target Tracking Camera may not pan to the target.

Turn off the Auto-Target Tracking Camera by pressing the **[Y]** key again. A message appears at the top of the HUD, reporting **TARGET TRACKING OFF**.

Autotarget tracking is most useful in air-to-air combat, but it takes some practice to master its use. Once you have read through the later chapters about air-to-air combat, set up some training missions against fighter aircraft and practice using this camera until you are comfortable with it.

Don't become seduced into leaving the Auto-Target Tracking Camera on for extended periods. You not only lose contact with the HUD, but flying from this camera view can be disorienting as well. At low altitude, crashes are a real danger. Use this camera for a quick glance to get find your opponent's position, and then return to the Close Cockpit view.

MULTIFUNCTION DISPLAYS

A silhouette of a fighter jet, viewed from the front, centered on the page. The jet has a single vertical stabilizer, a cockpit canopy, and swept-back wings. A large, bold number '5' is positioned to the right of the jet's tail.

5

To make the following discussion easier to follow, start the training mission described at the start of Chapter 2 once again. As soon as the Close Cockpit view appears, press the **[Alt] - [P]** keys to pause play, and read on.

At the far zoom of your Close Cockpit view, you can see two green screens in front of you, one to the lower right of the instrument panel and one to the lower left. They can be seen in Figure 5-1. These screens cannot be read in this view, but they can be enlarged and brought back toward you so that the information they report is visible. These enlarging screens are called multifunction displays, or MFDs.

These are called *multifunction* because several different displays can appear here, at your command. Important cockpit features such as the air-to-air radar screen, air-to-ground radar screen, communication interface, Damage display, Weapons Hardpoint display, and the Gun Camera can be seen in these display locations.

Activating Multifunction Displays

You can enlarge one multifunction display screen or both. When enlarged, the screen appears at either the right or left bottom of the cockpit display. For an example, resume play and press the **[D]** key. This brings up your Damage display, as shown in Figure 5-2, indicating what parts of your aircraft have been damaged, if any.

Figure 5-1
Multifunction
displays prior to
being enlarged



Notice how the multifunction display enlarges and comes back toward you so that it can be easily read. To close the display, press the same key that opened a display, in this case the **[D]** key. When only one display is activated, it always appears on the right side.

Press the **[D]** key again, plus the **[C]** key. Now you have two multifunction displays enlarged, one to the right and one to the left, as shown in Figure 5-3. The **[C]** key has opened the Communication Interface display (discussed below).

Figure 5-2
Damage MFD

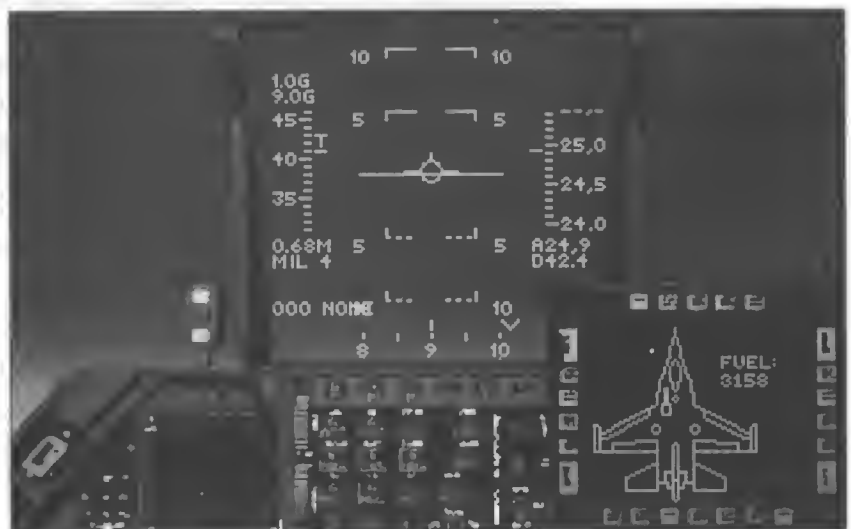




Figure 5-3

Damage and
Communication
Interface
MFDs open
simultaneously

Now zoom the Close Cockpit view in and out by pressing the **[F1]** key a few times. Notice that in the closer zoom the multifunction displays cover up part of the HUD. The left MFD covers up the Missile Warning Lights, regardless of the level of cockpit zoom.



If there is a chance of missiles being fired at you, don't open a second MFD. Keep the Missile Warning Lights visible to get the earliest possible warning of an approaching missile.

Multifunction displays close themselves under certain conditions, as noted below where appropriate.

Air-to-Air Radar

Air-to-air radar shows the proximity of other aircraft in the sky, within certain limitations. You generally want this radar activated when there is a chance of air-to-air combat. It is useful in helping to find, distinguish, and target enemy aircraft.

Air-to-air radar can operate in either of two modes: Multiple Target-Tracking or Single-Target Tracking Radar. Multiple-Target Tracking Radar shows all aircraft that your radar is scanning. Single-Target Tracking Radar concentrates only on the air target currently selected. In addition, you can activate the optional enhancements Smart Radar and 360 Degree Radar to make air-to-air radar even more useful and informative.

Activating Air-to-Air Radar

To activate air-to-air radar press the **[R]** key. This turns on the Multiple-Target Tracking Radar. Once the radar is on, press the **[K]** key to switch to Single-Target Tracking Radar. For these keys to work properly, you must have no weapon activated, or be in one of the following Weapon modes: DGFT, SRM, or MRM. These modes are selected when one of the following weapons are activated: Vulcan (in Dogfight mode), AIM-9J, AIM-9M, or AIM-120. If you are in a ground attack mode by mistake, pressing the **[R]** key opens ground radar instead. Figure 5-4 shows the air-to-air radar screen.

Press the **[R]** key a second time to turn off the air-to-air radar. If you change Weapon mode to a weapon used against ground targets (not one used in air-to-air combat), the radar automatically switches to air-to-ground radar.

Multiple-Target Tracking Radar

Assuming that your training mission is still underway and that the TU-95 is still out in front, press the **[W]** key to change the Weapon mode until you have selected DGFT to activate the Vulcan cannon. (Alternatively, when no weapon is activated, press the **[G]** key to switch immediately to Dogfight mode, as explained in Chapter 7.) Because the Vulcan has been activated for air-to-air combat, you can now press the **[R]** key to call up the air-to-air radar in the Multiple-Target Tracking mode. This mode is noted



Figure 5-4
Air-to-air radar

by the notation AIR at the top of the radar screen, as shown in Figure 5-4.

In this mode, radar reports the presence of all aircraft that can be detected within 80 nautical miles. All aircraft detected appear as small, square blips. If you have selected one of these aircraft as a target, its square blip is shown in brackets.

If the TU-95 is still in front of you, it appears on the radar screen as a square. When you turn on the radar it automatically selects the nearest available target, because at the Rookie level of difficulty the Auto-Targeting option is on. Because the TU-95 is selected, the single square on the radar representing the TU-95 appears in brackets.

The square representing the TU-95 can be seen near the center of the radar screen. The closer it is to the center of the screen, the closer it is to you. This orientation toward the center of the radar screen is another optional design feature of *Strike Commander*, called 360 Degree Radar. This is also operating because the level of difficulty is set at Rookie. Further discussion about the optional 360 Degree Radar is found later in this chapter.

When the 360 Degree Radar is turned off, your radar looks out only from the front of the F-16 in a 180 degree arc. It sees objects only in front of the F-16. Aircraft behind you are not detected at all. Aircraft that are detected in front of you are displayed on the screen. Be aware that aircraft behind mountains cannot be picked up by radar.

When the 360 Degree Radar option is not activated, think of the bottom of the radar screen as the front of your F-16 and the screen itself as the area extending out from it. The most distant objects appear at the top of the screen, because they are farthest from the airplane's nose. The nearest objects appear close to the bottom of the screen because they are closer to the front of the F-16.

Figure 5-5 shows air-to-air radar with the 360 Degree Radar option turned off. Notice that the blip representing the TU-95 is now at the bottom of the screen.

Air-to-Air Radar Scale

The default scale of the radar screen is 10 nautical miles, unless you have already designated a target. In that case, the radar automatically sets its scale so that the target is visible on the screen. The current scale is noted in the top left corner of the screen as either 10, 20, 40, or 80 nautical miles. When the scale is 80, the radar is looking out to a range of 80 nautical miles.

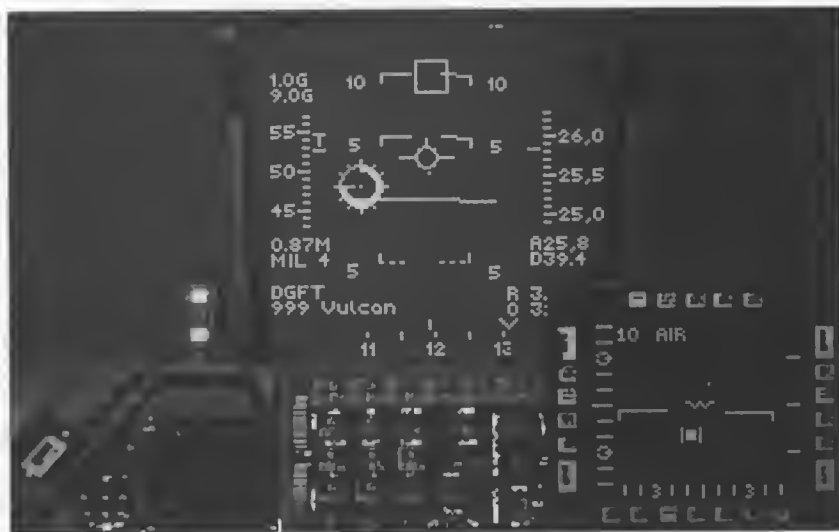


Figure 5-5
360 Degree Radar
turned off

You can increase the scale by pressing the **[]** key or decrease it with the **[]** key. If you attempt to increase the scale beyond 80, it wraps around and returns to a scale of 10. It also wraps around if you attempt to reduce the scale below 10.

In theory, setting air radar at the maximum scale of 80 nautical miles helps you pick up targets as they approach, before they are a threat. However, in *Strike Commander* enemies always appear much closer, without any approach. For this reason, the scale of 10 nautical miles works well most of the time. At this scale you can keep an eye on specific planes. Occasionally, you may want to increase the scale.

Waterline

When the 360 Degree Radar option is off, a small W appears, with horizontal lines on either side and extensions on the ends of these lines pointing down. These symbols can be seen in Figure 5-5. This is the Waterline, showing the relationship of your F-16's current roll aspect to the horizon. Over the sea, the Waterline is the horizon. Over land, the Waterline indicates where the horizon would be if no land or mountains were present.

When you roll your aircraft, the Waterline rolls up in exact proportion. Imagine that instead of seeing the Waterline, you are looking at the horizon through the windscreen. In Figure 5-5, the right side of the Waterline has rolled up, indicating that the F-16 has rolled to the right. The extensions on the end of the Waterline always point toward the horizon. When the extensions are

pointing up, the horizon is above you, indicating that you are flying upside down.

The Waterline keeps you informed of your position in the air while you are studying the radar screen. You don't have to look up at the HUD to note your current roll.

Smart Radar

Smart Radar is an optional *Strike Commander* design feature that increases the information available on your air-to-air radar screens. When Smart Radar is on, square blips are enemy radar contacts only. Friendly radar contacts are shown as triangles and neutral contacts are circles. Contacts already shot down but still in the air are shown as outlines of squares, triangles, or circles. Figure 5-6 shows several enemy aircraft in the air, one of which is marked with a square outline. This plane is shot down and falling from the sky.

Smart Radar can make an F-16 pilot's job much easier when the nearby airspace is crowded with aircraft from both sides, plus the occasional neutral. It can take you critical seconds to identify who is an enemy and who is not, or who is already plummeting earthward and not worth wasting ammunition on. You can easily make a mistake and shoot down a friend. Smart Radar greatly simplifies identification of other aircraft so that you can quickly target enemies that still pose a threat.

Smart Radar is turned on automatically as part of the default configuration for both the Rookie and Veteran difficulty levels. It

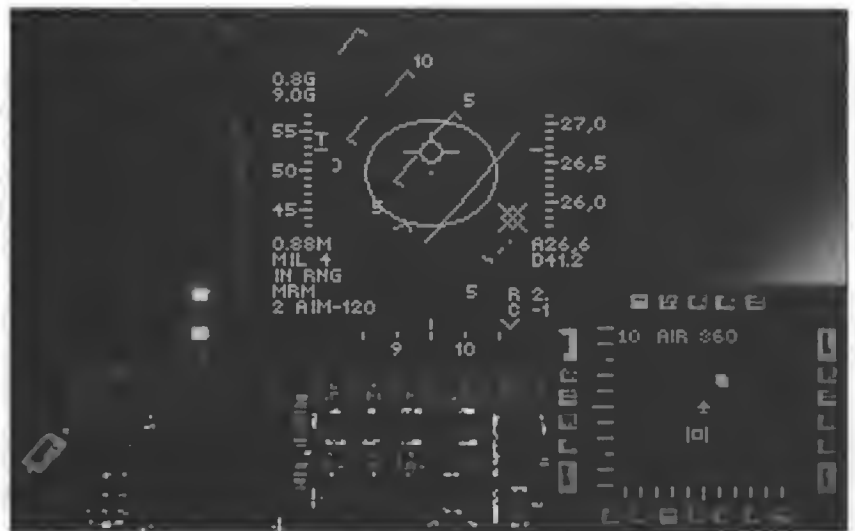


Figure 5-6

Air radar showing multiple targets, including one shot down

is off at the Ace difficulty level, although you can turn it on if you wish. To learn how to do this, see Chapter 6.

360 Degree Radar

360 Degree Radar is another optional *Strike Commander* design feature that makes air-to-air radar screens more informative. Normal F-16 radar scans only the 180 degree arc of airspace extending out from the front of your aircraft. Airborne objects not in front of you are not picked up and don't appear on your screen. Because of this limitation, you may have enemy aircraft nearby, or even on your tail, and the radar screen does not show them.

360 Degree Radar solves that problem by scanning the airspace around you in every direction. Your radar now shows all airborne objects within range, regardless of where they are in relation to the nose of your F-16.

When 360 Degree Radar is turned on, the relationship between where objects appear on the screen and how close they are to you changes. Now the aircraft's position is considered the center of the screen. Objects close to the center of the radar screen are close to you, and objects on the edge of the screen are farther away from you. Blips at the top of the screen are in front of you. Blips at the bottom of the screen are behind you.

360 Degree Radar is also turned on automatically as part of the default configuration for the Rookie and Veteran difficulty levels. At the Ace difficulty level it is off, but you may turn it on if you wish, as explained in Chapter 6.

Single-Target Tracking Radar

When you wish to concentrate on one enemy aircraft, you can turn on Single-Target Tracking Radar instead of Multiple-Target, by pressing the **[K]** key. For the **[K]** key to work, Multiple-Target Tracking Radar must have already been turned on with the **[R]** key. Single-Target Tracking Radar is marked by the notation STT at the top of the radar screen, seen in Figure 5-7. Single-Target works like Multiple-Target Tracking Radar in terms of scale and also has a Waterline, but there are some important differences.

If you press the **[K]** key while this radar mode is operating, you return to Multiple-Target Tracking Radar. If you press the **[R]** key while Single-Target Tracking Radar is operating, the radar goes off. If you then press the **[R]** key again, when radar comes back on, it is still in the Single-Target Tracking mode it was in when turned off.

The single target that you are tracking appears on the screen as a diamond. Four additional pieces of information about the



Figure 5-7
Single-Target
Tracking air-to-air
radar

target appear on the right side of the screen: Target Heading, Target Speed, Target Aspect Angle, and Target Altitude.

If the TU-95 you are chasing is still nearby, clear any multifunction displays you have turned on. Activate the Vulcan cannon in Dogfight mode. Press the **[R]** key to turn on air radar and then press the **[K]** key to switch it to Single-Target Tracking mode. A sample of what you might see is shown in Figure 5-7.

Target Heading

The Target Heading is the current heading of the target in degrees. If the Target Heading is 180, then it's heading 180 degrees, or due south. Knowing the target's heading is a clue to finding the best maneuver to get a shot at it. By taking a quick glance at the Direction Tape on your HUD, you can calculate which way to turn to intercept or get onto the target's tail.

Be aware, however, that in a dogfight aircraft are almost constantly turning. This means that aircraft in dogfights rarely hold a heading for any meaningful length of time.

On the Single-Target Tracking Radar, the target's heading is shown as HD###, where HD stands for heading and the number is the compass heading in degrees. Figure 5-7 shows that the TU-95's Target Heading is 155, or 155 degrees.

Target Speed

Target Speed is the current true airspeed of your target in knots per hour. On the radar screen, the target speed is shown as SP###K, where SP stands for speed and the numbers plus K stand for the number of knots. In Figure 5-7 the airspeed of the

TU-95 is 275K or 275 knots per hour. Knowing your target's airspeed can be helpful as you maneuver to shoot. By comparing the target's speed to yours you can judge whether you are closing too fast or falling behind, and adjust your speed as necessary.

Also, be on the lookout for sudden changes in Target Speed that may indicate afterburner or brakes being used in an attempt to shake you off.

Target Aspect Angle

Target Aspect Angle measures how far you are off an imaginary line drawn through the nose and tail of the target. When the Target Aspect Angle is 0, you are directly behind the target. When the angle is 180, you are directly to the front. When the angle is around 90, you are roughly pointed at the side, top, or underside. The angle can never go higher than 180 because once you go past the target's front you are getting closer to it's rear from the other side and the angle begins falling toward 0 again. The closer the angle is to 0, the better the angle for a missile shot. You want to be behind a target, because he is a better target in that position and he can't shoot you from there.

On the radar, Target Aspect Angle is shown as AS### where AS stands for aspect angle and the numbers are the actual angle away from direct alignment. In Figure 5-7, the Target Aspect Angle is 035, or 35 degrees. This means the F-16 is 36 degrees off from being directly lined up behind the target.

Target Altitude

Target Altitude reports how high the target aircraft is in thousands of feet. You can quickly calculate whether the enemy aircraft is above you or below by comparing its altitude to your own. Remember your altitude can be read from two places on the HUD. Once you know the target's altitude, decide whether to climb or dive.

In Figure 5-7, the Target Altitude is 29, or 29,000 feet. The TU-95 is slightly above the F-16. Knowing this, the F-16 might climb to get right on the TU-95's tail, climb higher for a diving attack, or approach from below to shoot at the TU-95's underside.

Air-to-Ground Radar

Air-to-air ground radar shows the approximate location of potential targets on the ground. It helps you find ground targets and it can also help you find runways when you wish to land. Remember,

however, that ground targets are easily obscured by terrain: at any moment you may not see on the radar all nearby targets.

Ground radar can be improved in effectiveness by turning on the optional enhancement 360 Degree Radar.

Before reading further about ground radar, make the following adjustments to your training mission. Press the **[W]** to enter STRF Weapon mode. Turn off all multifunction displays that are still operating. Press the **[N]** key to call up the NAV map and select Halverston as your waypoint. Press the **[N]** key again to return to the cockpit and then press the **[A]** key to autopilot to Halverston. When you come out of autopilot at Halverston, read on.

Activating Air-to-Ground Radar

Press the **[R]** key to activate the air-to-ground radar. It should pop up at the lower right of the cockpit. For this to work, you must be in one of the following Weapon modes: STRF, I-R, CCIP, or CCRP. These modes are selected when one of the following weapons are activated: Vulcan (in Strafing mode), AGM-65D Maverick, Mk82 general purpose bomb, Mk20 Rockeye cluster bomb, GBU-15(V)/B smart bomb, LAU-3 rocket pod, or Durandal runway cratering munition.

Ground radar is deactivated in the same manner as air radar. Refresh your memory by pressing the **[R]** key twice. The first keystroke removes the ground radar and the second restores it.

Once you have the ground radar operating, pause play so that the screen can be described.

Reading Air-to-Ground Radar

When the air-to-ground radar is operating, the notation GND appears at the top of the screen. Ground radar shows all potential targets on the ground within detection range, unless they are obscured by terrain. Potential targets are noted by square blips. A sample ground radar screen for part of Halverston is shown in Figure 5-8.

As you fly over and around Halverston, square blips appear on the screen. These blips are targets against which you can use weapons. Look for a clump of blips and fly toward them. These are a group of skyscrapers in the downtown area. Be careful not to fly too near single radar blips. These may be antiaircraft guns and they can shoot you down.

If you are still playing at the Rookie level of difficulty, the 360 Degree Radar is on. If so, the notation 360 appears at the top of the ground radar screen. With 360 Degree Radar on, the position



Figure 5-8
Ground radar
image of part of
Halverston

of your F-16 is represented by the center of the radar screen, as it is for air-to-air radar. As you approach the group of tall buildings in Halverston, the blips represented on the radar screen move closer to the center of the radar screen.

When the 360 Degree Radar is turned off, ground radar looks out only from the front of your F-16 in the same 180 degree arc as it does for air-to-air radar. Remember that objects behind mountains or below the lip of a canyon may not be picked up by ground radar.

When the 360 Degree Radar option is not activated, ground radar scans in a similar manner to air radar. Here, also, the most distant objects appear at the top of the screen, because they are farthest from the F-16's front. The nearest objects appear close to the bottom of the screen because they are closer to the front of the F-16.

Ground Radar Magnification

Maximum range for ground radar is approximately 12 nautical miles. You cannot increase the scale of the area being scanned as you can for air-to-air radar. However, you can increase the magnification of the area being scanned.

When ground radar first turns on, the magnification level is one, the normal view, marked by the notation 1x in the top left corner of the ground radar screen. You may increase the magnification level by pressing the **[F]** key and decrease it with the **[B]** key. The possible levels of magnification are 2x, 4x, 8x,

16×, and 32×. Each higher level of magnification reduces the total area appearing on the screen, but shows it in greater detail. Figure 5-8 shows the level of magnification to be 2×, or twice normal.

For example, fly over the group of buildings in downtown Halverston and, as you do, experiment with increasing and decreasing the levels of magnification. Notice that the radar screen blips spread farther apart as you increase magnification. Also note that the total area being looked at shrinks. As you fly past the buildings, you must reduce the magnification to keep them on the ground radar screen.

Being able to change the magnification of your ground radar screen can be useful during ground attacks. As you approach a group of targets, magnifying the group may make it easier to pick out the priority targets and line up the approach to attack them first.

All objects picked up on ground radar appear as square blips, with two exceptions: runways and moving ground vehicles. Runways appear as long rectangular shapes to make them easier to pick up. This is important because picking out a runway from a distance gives you the time to make any turns necessary to approach it end-on for a landing, or for bombing.



Vehicles moving on the ground appear as two small ground radar blips because of an unforeseen feature of Strike Commander. Moving vehicles have two components: the vehicle itself and a terrain feature tied to it that represents the tread marks appearing behind it as it moves. The ground radar picks up both the vehicle and its tread marks, showing the combined blip. This turns out to be very useful when attacking these targets. When you destroy a moving vehicle, the treads disappear from sight and from radar. So you can distinguish active vehicles from destroyed ones by the multiple radar blips versus the single blips.

The optional 360 Degree Radar has the same effect on ground radar as it does on air-to-air radar. The optional Smart Radar has no effect on ground radar.

Communication Interface

To open the Communication Interface MFD, press the [C] key. The Communication Interface screen allows you to talk to other friendly pilots and to your base during a *Strike Commander* mission by opening a menu of radio channels. Each channel is preceded by a number. To open a channel, press the number key that

corresponds to it. Figure 5-9 shows a Communication Interface MFD from a *Strike Commander* mission.

When you open a channel, the Communication Interface screen changes to list the messages that you may send. Each message is again preceded by a number. Press the appropriate number key for the message you want. The message is then sent. You may or may not receive a reply. As soon as a message is sent, the Communication Interface screen turns off automatically.

As you get deeper into the *Strike Commander* game, there will be times when you want to give orders to your wingman or send other messages. Knowing how to send orders quickly to the right person can mean the difference between success and failure.



Remember that the number keys used to choose channels and messages are also the keys used to set the throttle. While the Communication Interface screen is up you cannot use these keys to change the throttle setting. You can use the $\boxed{+}$ and $\boxed{-}$ keys to increase or decrease throttle.

For this reason you generally won't want to leave the Communication Interface screen up needlessly. However, an exception to this may occur when you are approaching a waypoint and expecting action. If you plan to have your wingman break formation and seek independent targets, you may want to have the proper channel ready. As soon as the enemy aircraft appear, press the appropriate message key to have your wingman break formation.



Figure 5-9
Communication
Interface MFD

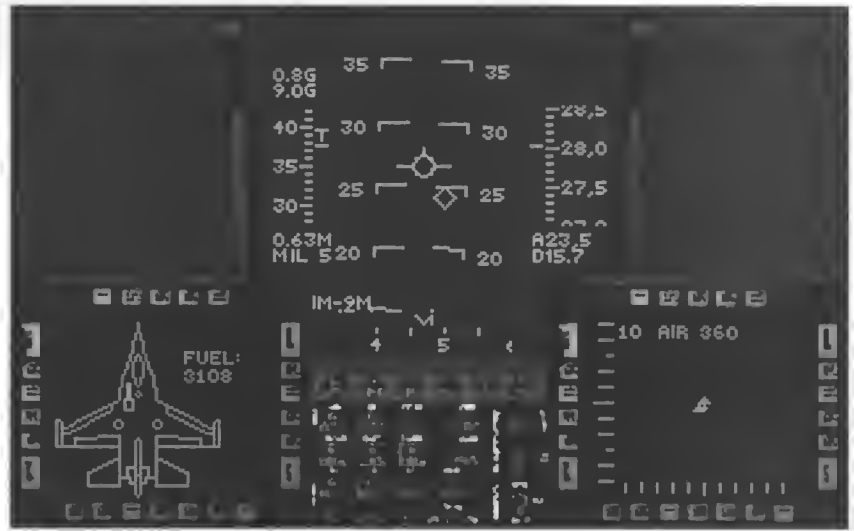


Figure 5-10
Damage MFD

Damage Display

To open the Damage MFD, press the **[D]** key. This screen shows at a glance what parts of your F-16 are damaged, the extent of that damage, and the amount of fuel remaining on board. The display is a schematic drawing of the F-16, as seen in Figure 5-10.

Damaged parts of the aircraft are highlighted in yellow. Destroyed parts are highlighted in red. Damaged parts continue to function normally in most cases. If the engine is damaged, your top speeds are reduced and fuel consumption may rise. Destroyed parts of the aircraft cannot be used for the rest of the mission. You can land safely on damaged landing gear.

Table 5-1 lists the sections of the F-16 that can be damaged and the effect when they are destroyed.

All damaged parts are repaired automatically before your next mission, if you can get the plane back to base.

Before landing, however, check the status of your landing gear: if it is destroyed, you will have to bail out to reach the ground safely.

If any section of your F-16 is destroyed, your chances of successfully completing a mission are very small. Either head for home, or start the mission over.

Fuel

On the right side of the Damage display is a readout of the amount of fuel you have remaining, measured in kilograms. This can be seen in Figure 5-10. Keep track of fuel, because when you run out

Table 5-1 F-16 Parts Liable to Damage

F-16 Section	Effect of Destruction
Radar	Neither type of radar works
Cockpit	Pilot killed—mission over
Gun	Gun can't be fired
Flaps	Flaps don't work
Ailerons	Difficult to roll aircraft
Elevators	Difficult to pitch aircraft
Rudder	Rudder doesn't work
Engine	Top speed declines; fuel consumption up
Landing gear	Can't land without crashing
Fuel remaining	Fuel consumption increases dramatically

the engine quits and your F-16 falls to the ground. When the remaining fuel becomes critically low, a fuel warning message flashes on the HUD. By the time you see this message, however, it may be too late to do anything about it. You need to keep track of fuel and have in mind a level at which you plan to head for home.

The *Sudden Death Technical Supplement* (p.67) describes a simple method for keeping track of your critical fuel level.

Note that fuel tanks are on the Damage display and are a possible site for damage. The word FUEL and the number representing the kilograms remaining turn yellow when damaged and red when destroyed. When fuel tank integrity is destroyed, fuel use goes way up. There is little point to continuing a mission if your fuel tanks are destroyed.



The F-16 in Strike Commander is most fuel efficient when flying at 35,000 feet at Throttle Setting MIL4, set with the [4] key. For long flights, rise to 35,000 feet quickly, set your heading, and put the throttle at this setting. This conserves fuel during transit periods when there is no combat action.

Weapons Hardpoint Display

The Weapons Hardpoint MFD is opened whenever you press the [W] key to change Weapon mode. The Weapons Hardpoint display presents the underside of the F-16, showing all weapon hardpoints, what weapons are mounted, how many of each type remain, chaff rounds remaining, and flares remaining (see Figure 5-11).

The Weapons Hardpoint display also shows the weapon currently activated by placing a rectangle around its icon on a hardpoint. The name of this weapon is abbreviated at the top right of the display. The display also shows whether you are in Normal Combat mode (NORM) or Air Combat Maneuver mode (ACM). The difference between these modes is discussed in Chapter 7.



The Weapons Hardpoint display stays up for only a few seconds before turning off automatically. If you want to look at it carefully, pause the game when it comes up and take your time examining it. Otherwise, it can turn off before you are finished with it. To open it again you must press the [W] key again, which changes the Weapon mode. You can waste a lot of time getting back to the weapon you want activated.

Weapons Remaining

Figure 5-11 shows the Weapons Hardpoint display of an F-16 carrying 2 AIM-9Js, 2 AIM-120s, 4 LAU-3 rocket pods, and 12 Mk82 general purpose bombs. At the top of the display the number 1000 indicates the number of 20mm shells remaining for the Vulcan cannon. The two diagonal lines extending toward the left and right sides of the display represent the wings. On each wing there are four hardpoints, for a total of eight.

The hardpoint nearest the top of the display is the heavy hardpoint, the next down is the medium hardpoint, the third down is a light hardpoint, and the last is the rail on the wing tip.

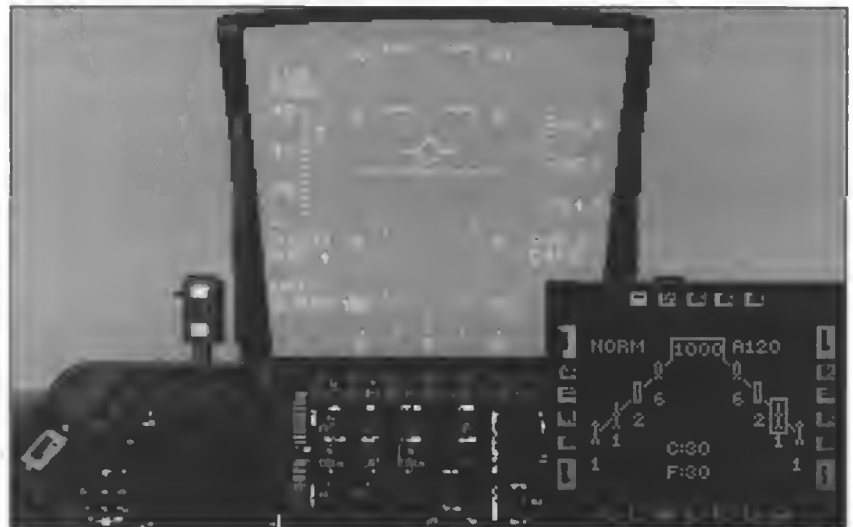


Figure 5-11
Weapons
Hardpoint MFD

Hardpoints are discussed in more detail in Chapter 7. The hardpoints in Figure 5-11 all have weapons present.

Each type of weapon that can be mounted on a hardpoint has a unique icon. Below the icon of the weapon is a number that tells you how many of that weapon type remain on the hardpoint. For example, in Figure 5-11, the top hardpoint on the left wing of the display shows the icon for Mk82 bombs and the number 6 below the icon. This indicates that six Mk82 bombs are currently mounted on the heavy hardpoint on this wing.

Weapons are removed from hardpoints in three ways. Most commonly they are removed when used (fired or dropped, depending on the type of weapon). They can also disappear off hardpoints if blown off by enemy fire. They can also be removed deliberately by being jettisoned.

Jettisoning Weapons

To jettison the weapon currently selected, press the **[Ctrl] - [W]** keys. The currently selected weapon is shown on the HUD just below the Weapon mode readout. All of that type of weapon on your plane drop away immediately.

Alternatively, press the **[Shift] - [W]** keys to jettison all air-to-ground weapons. Pressing this key drops all bombs and rocket pods. To see this happen, start a new training mission and load air-to-air missiles on your outside hardpoints, and rockets and bombs on the inside hardpoints. Once in the air, open the Weapons Hardpoint display to check inventory. Then press the **[Shift] - [W]** keys. Check the Weapons Hardpoint display again. All of the rockets and bombs are gone.

The *Strike Commander Technical Supplement* (p.60) states that pressing the **[Shift] - [W]** keys cycles backward through weapons when selecting one for activation. This is wrong. The **[Shift] - [W]** combination jettisons ground weapons as described here.

There may be times when you must quickly reduce the number of weapons that you are carrying to improve the flight dynamics of your F-16. Carrying even a moderate load of munitions increases the weight and drag of the plane, making it slower and less maneuverable. This can be a serious handicap in a dogfight against good pilots and advanced fighter aircraft.



Rocket pods do not disappear when they are empty. They remain on your wing and are a source of drag. Once you have fired off all of the rockets within the pods, there is no reason to carry empty pods home. If you engage in air-to-air combat with empty pods on board, don't hesitate to jettison them.

Chaff and Flares Remaining

In the lower center of the Weapons Hardpoints display are readouts reporting how many chaff charges and decoy flares remain available, as shown in Figure 5-11. When you start a new mission, your F-16 automatically has on board 30 of each device. They are dropped off during combat to decoy enemy missiles tracking your F-16. Each time one is dropped, the number remaining drops by one. When the number remaining reaches zero, you have none left to drop.

The use of chaff and flares is discussed in Chapter 8.

Gun Camera

Press the **[F8]** key to turn on the Gun Camera MFD. This camera is unique because it pops up while you are in the Close Cockpit view. Depending on what weapon you have activated, the Gun Camera shows either a view of the target currently selected or a view of what is directly in front of the F-16's nose.

The Gun Camera focuses in on the selected target when the HUD is in one of the following Weapon modes: SRM, MRM, or I-R. In these case, the camera locks on the selected target and stays with it. For all other Weapon Modes, the Gun Camera films just what is visible straight out from the nose of the F-16.

The picture in the Gun Camera is little more than a few dots until you get within 15,000 feet (less than 3 nautical miles) of a selected target, or until something passes in front of the nose. When you get within 15,000 feet, a close-up of the target can be seen on the screen, called the Target View. Figure 5-12 shows a TU-95 in the Gun Camera.

In the center of the camera screen is a cross hair to assist in aiming some weapons. If the cross hair is centered on a target in the camera, if the F-16 is flying stable, and if the target is within range, there is good chance of getting a hit with the Vulcan cannon or with rockets.

The Gun Camera is not of much use when using missiles in air-to-air combat and is normally left off. It is very important when using the GBU-15 and Maverick missile, as discussed in Chapter 12.

The Gun Camera is also useful for identification of targets. There may be instances when you must pick out real targets within a group that contains objects you don't want to hit. You may be able to make visual identification from the camera. The camera switches to the detailed target view long before you can make

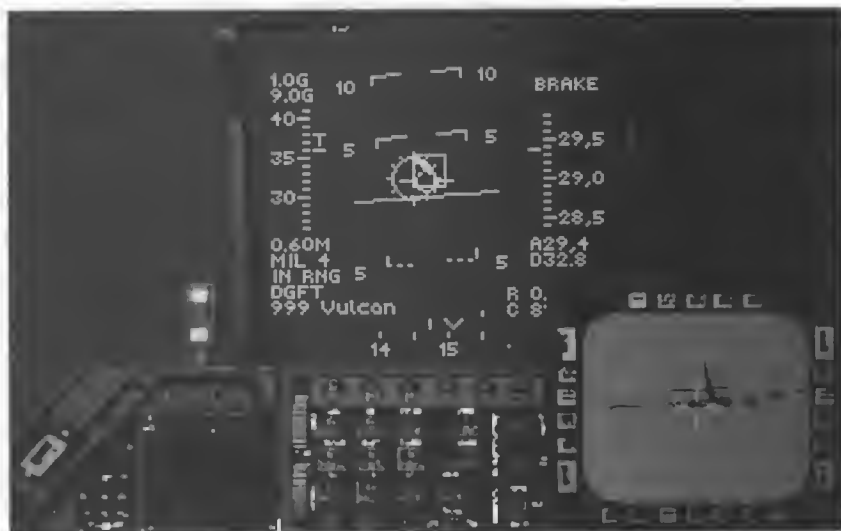


Figure 5-12

Gun Camera
showing a TU-95
being approached
from the rear

visual identification. This can be useful when trying to differentiate targets.

To see the Gun Camera in action, start up the training mission described at the beginning of Chapter 2 once again. Once you are in the air, press the **[G]** key to set your Weapon mode to DGFT. Press the **[R]** key to turn on your air-to-air radar and press the **[F8]** key to turn on the Gun Camera display. As you approach the TU-95, attempt to point the F-16 right at it. Watch as the bomber gets larger, both through the windscreen and in the Gun Camera picture. If you can center the cross-hairs on the TU-95 at close enough range and hold steady, you have a good chance of hitting it with the Vulcan cannon. See Chapters 10 and 12 in this guide for more information on using the Gun Camera to advantage.

The Gun Camera MFD can be set to show or not show any terrain surrounding the target. This is the Terrain in Gun Camera option explained in Chapter 6.

GAME OPTIONS



6

Strike Commander is designed to be flexible, both in terms of what type of game you wish to play and how challenging you want it to be. This chapter discusses the different types of game options that are available and their significance. Understanding the advantages and disadvantages of each option can help you customize game parameters to increase your fun and reduce frustration.

The first decision you are required to make concerns what type of game you wish to play. This choice is made at the Start-Up menu. Choose here whether to play the full *Strike Commander* game or fly a training mission.

Once you choose the type of game, customize play further by adding or deleting a number of features, using the Game Options menu. You can set play at first for a relatively easy degree of challenge and then gradually make it more demanding in later sessions as you gain experience and confidence. If you are a flight simulator pro, you may wish to start out immediately at a higher level of challenge.

Among the game options that can be turned on or off are some not yet available to pilots in the late twentieth century. Because *Strike Commander* is set in the second decade of the twenty-first century, the designers have made available a number of technical improvements that are only wishful thinking right now. These improvements help both new pilots and experts, but you can turn them off at any time if you think they are making life too easy.

In the section about game configuration, each Game Options menu choice is discussed in one place. You can read about how to turn options on or off, and get a brief summary of the advantages of each. Be aware, however, that most options that affect the way the game is played also incur a penalty on your mission score. At the end of this section there is a discussion of how option penalties are assessed.

At the end of the chapter are brief discussions of two additional game options: the first concerns how to save games and use saved games. The other concerns speeding up game time.

Start-Up Menu

The Start-Up menu appears after the title sequence. It offers you two main choices: playing the full *Strike Commander* game or playing a training mission. The View Objects option does not get you into the game, but is instead a chance to see what some of your future foes and targets look like.



*If you don't wish to watch the title sequence each time you restart Strike Commander, press the **[Esc]** key when the sequence begins. This bypasses the title screens and opens the Start-Up menu.*

The *Strike Commander* Game

To begin the full *Strike Commander* game from the Start-Up menu choose the option Start New Game. The option Continue Game puts you into the full game by restarting the full game at the your last autosave position. This is explained in more detail later in the section about saving games. The option Load Game also puts you into the full game by letting you choose which of your previously saved games to load. This option is also discussed below in the section about saving games. If you have not previously started a new game, then you cannot load or continue a game because those files don't exist. In this case, the Load and Continue options cannot be chosen.

Training Missions

Because the *Strike Commander* game can be very demanding, new players are advised to undertake a number of training missions before jumping into the full game. You need to be at least marginally familiar with flying and fighting the F-16 because it is too easy to make mistakes and become frustrated. The pace of action can be so overwhelming that a rookie pilot has little chance of understanding what is happening or of learning from mistakes.

Work through a number of different types of training missions, concentrating on the individual skills you are going to need, one or a few at a time. Familiarize yourself with the heads-up display (HUD), the multifunctional displays, the flying controls, and at least a few of the weapons before attempting the full game. Later, you can return to training for refresher courses when you run into difficulties with a particular game mission. With a little imagination, training can be fun as well as instructive.

All training missions are flown in the same training world. A description of the training world and suggestions about designing training missions are found in Chapter 15.

When you choose Training Mission from the Start-Up menu, a series of additional menus open from which you design the mission you wish to fly. On all of these menus, the Back-Up option takes you back to the previous menu. This allows you to reconsider or change mission options at any time prior to the mission actually starting. There are two types of mission available: Dogfight (air-to-air combat) or Search-and-Destroy (ground attack). Push the button for the one you want, as shown in Figure 6-1.

Dogfight Missions

When you choose a dogfight mission, you set the parameters of the mission by choosing how many enemy aircraft to engage, what types of enemy aircraft, enemy pilot skill, the beginning altitude of the engagement, and the weapons to load on your F-16.

Enemy aircraft are chosen in groups, and there can be several different groups. For example, one group might consist of five



Figure 6-1
Training Mission
menu

TU-95 bombers while a second group includes fighters as escorts. The number of aircraft and the number of different types you can choose is limited by the program. For example, if you want to fly against an aircraft with a complicated shape, such as the YF-22, the program allows you to choose only a few of them. You can choose many more of simpler design, such as the TU-95. Experiment to see what is possible.

Number of Enemy Aircraft Press the appropriate button for the number of enemy aircraft you want in the first group, from one to five as shown in Figure 6-2. Choose only a few fighter aircraft at most, until you have more experience. If you attempt to take on too many fighters, you are likely to be overwhelmed. Selecting a larger number of bombers or other aircraft that can't shoot back provides a number of targets to practice against.

After choosing the number of aircraft in the group, choose the type of aircraft you want them to be.

Type of Enemy Aircraft Once the number of aircraft in the group is determined, then choose the type of aircraft for the group. Push the button on the Option menu for the type of aircraft you want, as shown in Figure 6-3. All planes in the group are of the same type. So if you have chosen five aircraft and make the type F-15s, you encounter five F-15s.

To build another group of enemy aircraft, press the More button. When you are satisfied with the opposing force, press the Enough button.

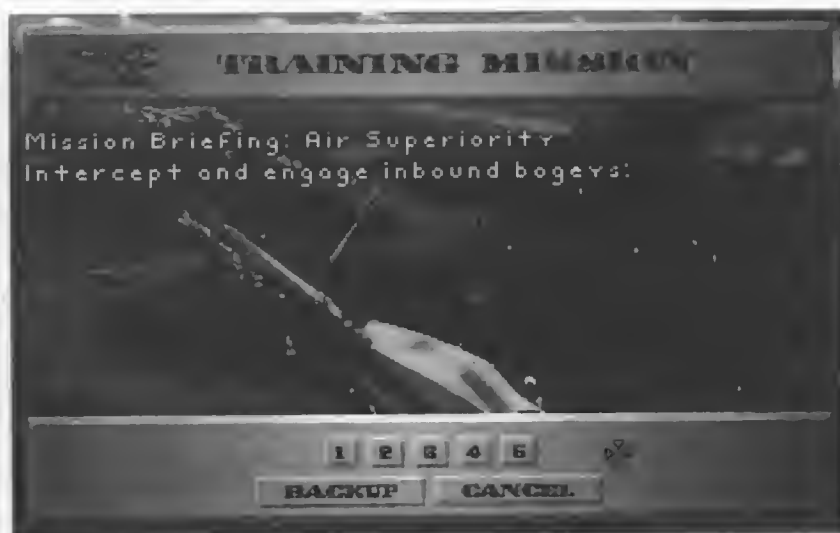


Figure 6-2
Option screen for
choosing the
number of enemy
aircraft in a
dogfight mission
group



Figure 6-3

Option screen for selecting the aircraft type in a dogfight mission group

Altitude Choose the altitude at which you wish to start the dogfight by pushing the appropriate button. Your choices are 5,000, 15,000, 25,000, or 35,000 feet, as shown in Figure 6-4. Opposing aircraft will be found nearby.

Opponent Skill Choose whether the opposing pilots are rookies, veterans, or aces by pressing the appropriate button. All opposing pilots have the same skill level.

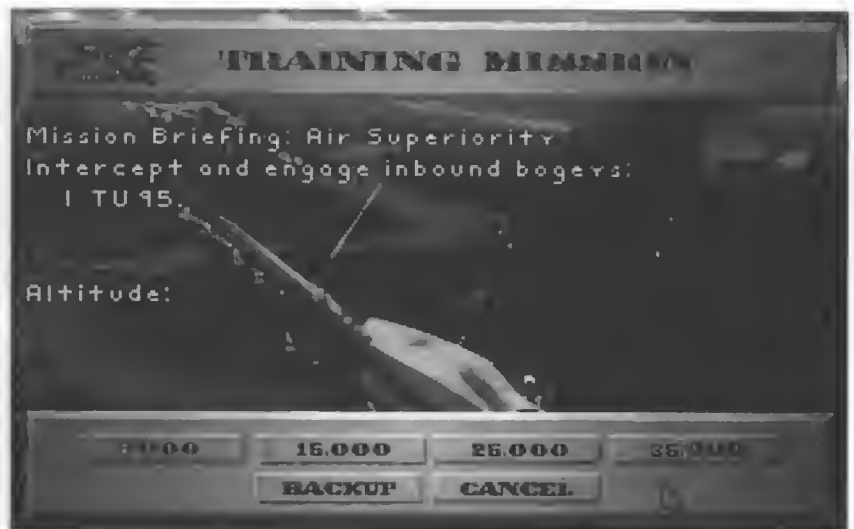


Figure 6-4

Option screen for choosing the altitude of dogfight mission engagement

Load Weapons The Weapon Loading display consists of an F-16 parked in front of a hangar with the various weapons it can carry spread out in front. Figure 6-5 shows the Weapon Loading display screen. Click on a weapon in front of the plane to load it. Click on a weapon already on the plane to unload it. Air-to-air weapons are missiles: the AIM-9J, the AIM-9M, and the AIM-120. The Vulcan cannon is automatically loaded with 1,000 rounds before any mission. You also start all missions with 30 charges of chaff and 30 flares.

If you are not satisfied with the training mission that you have planned at this point, click on the hangar behind the F-16 to return to the Start-Up menu. Otherwise, click on the cockpit of the F-16 to begin the mission.

Search-and-Destroy Missions

When you select a search-and-destroy training mission, the setup consists only of loading the F-16 with the weapons you wish to take. This is done at the Weapon Loading display screen, as it is for dogfight missions. When you are finished loading weapons, click on the cockpit of the F-16 to begin the mission.

All search-and-destroy missions begin with you in the cockpit of the F-16 over the sea at the north end of the training world. Halverston is already selected as your waypoint. Fly to any location on the map to practice ground attacks. A description of the various locations and what can be found there is included in Chapter 15.



Figure 6-5
Weapon Loading
display screen

Game Configuration

All game play options can be changed from a series of menus that begin at the main Configuration menu. The Configuration screen can be opened only while a mission is underway. From the cockpit, press the **[Alt]** - **[O]** keys. This opens the Configuration menu shown in Figure 6-6.

The Configuration screen has thirteen buttons: three are game play options that set the level of difficulty for the current mission; six buttons under the title Submenus open other screens for specific game options; the bottom four buttons relate to the Configuration screen itself.

Level of Difficulty

The three Gameplay buttons are labeled Rookie, Veteran, or Ace. Pressing any one of them sets the level of difficulty for your mission. Rookie is the easiest level of play, then Veteran. Ace is the most difficult. Each level of difficulty has an associated prearranged configuration of options that are turned on or off. These option configurations are listed in Table 6-1.

For example, choosing the Gameplay option Veteran sets all options on or off as listed under the Veteran column of Table 6-1. The options themselves are explained later in this chapter.



For most versions of Strike Commander, when you push in one of the three buttons to determine the level of difficulty, the input is read but the button does not stay pushed in. Remember which button you have pushed or make a



Figure 6-6
Configuration menu

Table 6-1 Level of Difficulty Option Configurations

Option	Level of Difficulty		
	Rookie	Veteran	Ace
Midair Collisions	Off	On	On
Easy Landings	On	On	Off
Stalls	Off	On	On
Unlimited Ammo	On	Off	Off
Easy Gun Hits	On	On	Off
Enemy Intelligence	Rookie	Veteran	Ace
Auto Targeting	On	On	Off
360 Degree Targeting	On	On	Off
Smart Targeting	On	On	Off
Sun Glare	Off	On	On
Gravity Effects	Off	On	On
Smart Radar	On	Off	Off
360 Degree Radar	On	Off	Off
Smart RAW Scope	On	Off	Off

note. Alternatively, you can open the Gameplay submenu and see what the level of enemy intelligence is. If you haven't changed enemy intelligence, the level marked with a pushed button here also indicates the level of difficulty you chose.

Once you have determined the level of difficulty, you may still go into the submenus and turn on or off any specific options you wish. For example, choosing the Veteran level of difficulty automatically turns off the Smart Radar option, as seen in Table 6-1. You may go into the submenus and turn the Smart Radar on, leaving the rest of the Veteran configuration alone.

In addition to the Configuration options shown in Table 6-1, choosing the level of difficulty also determines the range of skill of opponent pilots. At the Rookie level enemy pilot skills range from mediocre to very poor. At the Ace level they range from mediocre to excellent. Veteran-level skills are around the middle of the range.

Note that during a training mission you set pilot skills twice. They are set once during the mission design and once again when the level of difficulty is chosen. To face the worst pilot skills, choose Rookie pilots and a Rookie level of difficulty. To face the best,

choose Ace pilots and an Ace level of difficulty. For game missions, enemy pilot skill is also set with the level of difficulty, but may be further adjusted by setting enemy intelligence from the Gameplay submenu.

Specific Configuration Menu Buttons

The specific Configuration screen buttons are labeled Save, Default, Exit, and Exit Game.

Save Button

Press the Save button to save the game configuration after you have set all options as you wish. Thereafter, when you load any training or game mission, the configuration remains as you arranged it. If you wish to make some adjustments later, simply change it and press the Save button again. This saves your new configuration.

Default Button

Press the Default button to restore the configuration to the one that was last saved. If you haven't saved a configuration, the program automatically sets the level of difficulty to the Ace level and the configuration as shown in Table 6-1 for that level.

The Default option can be useful if you have been playing according to one configuration for a few missions and change several options to see what they would be like. If you find out you don't like the new configuration, press the Default button to restore the old configuration. This avoids having to remember what configuration you liked previously.

Exit Button

Press the Exit button to leave the Configuration menu and return to play.

Exit Game Button

Pressing the Exit Game button opens the Exit Game menu, shown in Figure 6-7. From this menu you can make four choices: Restart, Abort, Continue, or Exit.

Restart Option Choose the Restart option at any time during a mission to start it over again immediately. Training missions are restarted with you in the cockpit. Game missions restart on the runway with your F-16 prepared for takeoff. In both cases



Figure 6-7
Exit Game menu

you cannot go back to change any premission arrangements regarding weapons loaded or your wingman. You also can't review the pre-mission briefing.

Nevertheless, this is a very useful option. Part way through a game mission that is not going well you can simply restart and then try a different tactic. Or you can restart after taking some critical damage, or missing with an important weapon, or losing your wingman.

The Restart option is also useful when training. If you want to keep practicing bombing runs against a certain type of ground target in the training world, dogfights against top opponents, and so on, restart to try again instead of going through all the steps of reloading the training mission.

Abort Option Choosing the Abort option has different results, depending on whether you are on a training mission or a game mission. If you abort a training mission you are taken back to the Start-Up menu at the beginning of the game.

If you abort a game mission, you are taken back to base as if the mission had not been started. This allows you to talk to other Wildcat personnel around the base, review the mission briefing, choose a new wingman, and reload the F-16.

The difference between the Abort and Restart options for a game mission is how far back you go at the start of the mission. If you don't need to review the briefing or change weapons, then the Restart option works best.

Continue Option The result of selecting the Continue option also depends on whether you are interrupting a training or game

mission. From a training mission, choosing the Continue option takes you back to the Start-Up menu, just as the Abort option does. However, choosing the Continue option during a game mission has quite a different result.

When you choose to continue a game mission, the mission is immediately ended at that point and you are returned to base. ("Continue" in this case is perhaps a poor choice for the name of the option.) The program considers the mission completed as though you went through it completely. This means that if you haven't met all of the mission objectives, you won't have the chance to. In this case, the mission is not fulfilled and you do not receive credit for a successful completion.

The Continue option is most useful when you have completed the mission objectives and want to avoid making the flight home and landing. Once all mission objectives are met, choose this option to return immediately to base.



In some Strike Commander missions ambushes occur on your way back to base after objectives have been met. If you use the Continue option to go home, you miss these ambushes. You avoid the danger of the ambush, but also miss the opportunity to make more air-to-air kills and score additional points. Also, the Strike Commander Playtester's Guide indicates that using this option incurs a penalty of nearly one-third the points scored for successfully completing a mission.

Exit Option Choosing the Exit option takes you back to the Configuration screen. It's helpful to think of this option as meaning Back, not Exit.

Detail Submenu

The Detail submenu of the Configuration screen offers a number of options regarding the amount of detail seen in the terrain and objects encountered during play. The Detail sub-menu screen is shown in Figure 6-8. The three major categories of detail options are Terrain, Objects, and Hazing.

When you install *Strike Commander* the program determines the optimal setting for detail, on the basis of its analysis of your computer system's power. The more powerful your system the more detail it turns on and the better the game looks. For a weaker system, some of the details are turned off or cut back in order to save processing time. The program attempts to find a balance between acceptable detail and the ability to refresh screens fast enough to maintain a realistic sensation of flight.

From the Detail display, however, you may override the program's optimization and set the details as you wish. Push the



Figure 6-8
Detail submenu
screen

appropriate buttons to turn on options, and push them out to turn them off.

If you turn on too much detail for the power of your system, the screen refreshes slowly when you start to fly, and the motion of aircraft is jerky, not smooth. Decide how much detail you are willing to trade in exchange for smooth performance, and vice versa.

In the center of the display is a window that changes to show how terrain and object detail changes are going to look in the game. To see the effects of these changes even more clearly, start a training mission and fly over some interesting terrain, such as Halverston or one of the river canyons. Then adjust some of the Detail options and return to play to see how they affect the look of the game.

Terrain Options

Terrain options set the detail of the terrain you see below and to the front of the aircraft. The effect of changing these options is fairly easy to see from the window in the middle of the screen itself.

Object Options

Object options set the detail you see in specific three-dimensional objects such as your F-16, other aircraft in the sky, potential ground targets, ships, and weapons, etc. The effects of changing these options can be seen in the window of the display, but are more clear if you return to play after making the adjustments. Once

back in the cockpit, go to the External Camera view (press the **F6** key), pan around the F-16, and zoom in and out to see clearly the differences in detail on the F-16.

Push in one of the three Object buttons to set the level of detail you want to see. The button at the HI end turns on the highest level of detail. Details include such things as canopies and cockpits on aircraft, arrays on ships, and treads and hatches on ground vehicles. The button at the LO end sets the lowest level of detail.

Note that the Texture and Gourand options appearing in this submenu do not help determine object detail.

Haze Options

Push in a button along the scale from NEAR to FAR to set how close you want haze to begin obscuring distant terrain and objects. Setting haze to the far end of the scale means you see things relatively far away. Setting haze to the near end means you don't see things until they are relatively close. The longer the program is told to wait before having to show what you are flying toward, the faster the program can run. However, the sooner you see things, the more time you have to make flight adjustments for landings and attacks.



If you compare how the game looks at various haze settings you can see that there is little noticeable difference between the far and near settings. This was meant to be another way to customize the look of the game versus frame rate, but it didn't work out. Leave the haze in the far setting to get the maximum visual range.

Gameplay

The Gameplay screen controls three play options: Unlimited Ammo, Easy Gun Hits, and Enemy Intelligence, as seen in Figure 6-9.

Unlimited Ammo

When the Unlimited Ammo option is on during a training mission, you have an endless supply of any type of weapon loaded on your F-16. You can fire missiles, drop bombs, and use the Vulcan endlessly, so long as you continue flying, with two exceptions: if a weapon is blown off your plane or jettisoned, you no longer can fire it.

Note that the weapon must be loaded onto the F-16. If you load AIM-9J missiles, AIM-120 missiles, rockets, and Mavericks,



Figure 6-9
Gameplay menu
screen

you can't run out of these munitions (and Vulcan shells), but you can't fire anything else.

During a *Strike Commander* mission, the Unlimited Ammo option applies only to the Vulcan cannon.

The Unlimited Ammo option is primarily a training tool. It allows you to continue practicing with a particular weapon over and over again, without having to restart a training mission just to reload.



You do not take off with unlimited amounts of chaff or flares with the Unlimited Ammo option on. You still get only 30 of each.



If you have the Unlimited Ammo option on for a training mission, load the minimum of any weapon you intend to take. There is no benefit from carrying additional weapons and no penalty to the F-16's performance unless you are playing with the Realistic Flight option from Tactical Operations.

Easy Gun Hits

Having the Easy Guns Hits option on simply makes it easier to hit targets with the Vulcan cannon. If you intend to eventually work your way up to a higher level of difficulty, begin playing with this option off as soon as you can. However, new pilots should keep this option on until they become better pilots and able to control the F-16 more precisely.

Enemy Intelligence

The Enemy Intelligence option further adjusts the skill of the pilots you face during a mission. The title of the option is a slight misnomer. You set the program's artificial intelligence, which controls the skill and behavior of the enemy pilots, not the IQ of the pilots you face.

The skills of enemy pilots have nine different settings. These are determined by a combination of the level of difficulty (Ace, Veteran, or Rookie) and enemy intelligence (Ace, Veteran, or Rookie). For each level of difficulty the enemy intelligence can be set at one of the three choices. The toughest pilots have Ace intelligence at an Ace level of difficulty. The weakest pilots have Rookie intelligence at a Rookie level of difficulty. Average pilots have Veteran intelligence at a Veteran level of difficulty. Enemy pilot skills are discussed in more detail in Chapter 15.

Camera Options Menu

The Camera Options menu, shown in Figure 6-10, allows you to control some of the camera views described earlier. You can have certain cameras turned on and off by the program, automatically, at an appropriate time. Other options found here help control the frame rate of the game, in the same manner as the Detail options did.

Auto-Switching

The Auto-Switching option automatically switches you back to the Close Cockpit view, looking through the HUD, if you are in

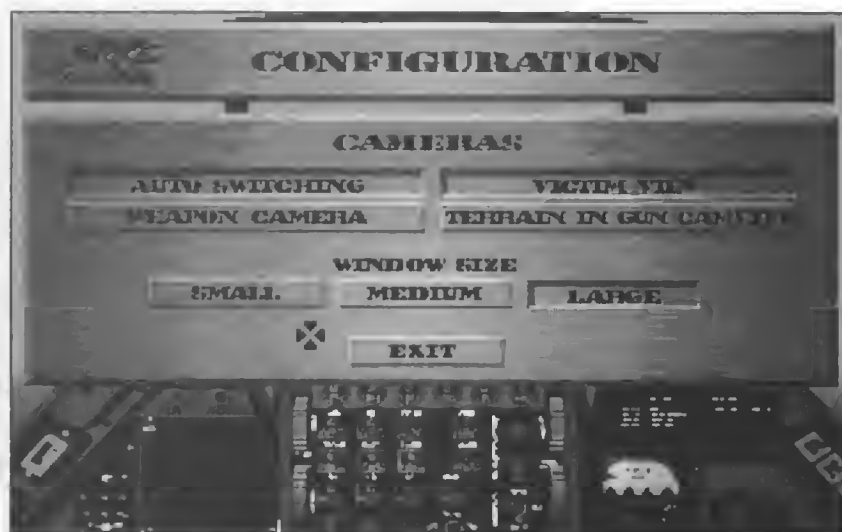


Figure 6-10
Camera Options
menu

danger of crashing into the ground or are hit by any weapon. If you turn on the Weapon and Victim Camera options discussed below, then turn on this option as well.

Weapon Camera

The Weapon camera follows the flight of any weapon, other than Vulcan cannon rounds, from release to impact. When the option is on, the program automatically turns on the camera after a weapon launch and rides along, filming the action. Note that if the weapon misses, the camera follows it anyway. Figure 6-11 shows the Weapon Camera following the flight of a Maverick missile toward a ZSU-23/4 antiaircraft gun.

Remember, if you can't afford the time to watch the weapon's flight, or if it misses, press the **[F1]** key to get back to the cockpit view and HUD. There is little purpose in continuing to follow the flight of a weapon that has missed but is still flying on.

Presetting the Weapon Camera is fun, but risky during game missions. See the next section for a discussion about this.

Victim Camera View

When the Victim Camera is on, the program turns on a camera automatically to film the weapon hitting its target (the victim). This is a close-up camera view of the action at the moment of impact. With this camera on, damage to the victim can usually be assessed immediately, on the basis of what you see happen to the



Figure 6-11

Weapon Camera
view of a Maverick
missile headed for
its target

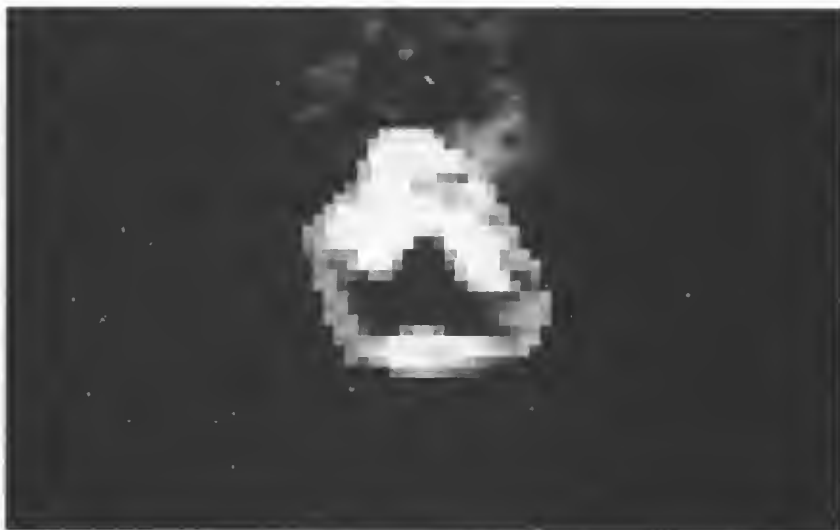


Figure 6-12

Victim Camera
view of a Maverick
hitting a ZSU-23/4
antiaircraft gun

target. Figure 6-12 shows the Victim Camera view that followed the Weapon Camera action shown in Figure 6-11.

This camera option works well in tandem with the Weapon Camera, because that camera follows the weapon in and then the Victim Camera takes over to show the hit in detail. If the Victim Camera is not on, it may be difficult to tell if the target is hit or not.

Hits may be seen if the Weapon Camera is on by itself, but not with the detail the Victim Camera provides. If the Victim Camera is on by itself, it turns on only if you score a hit. In this situation you would be flying along waiting for the Victim Camera view—only it never turns on. Eventually you are forced to conclude that you have missed. That is why these cameras work well together. The Weapon Camera keeps you posted on the status of the weapon and tells you immediately if you have missed. If you hit, the Victim Camera lets you immediately assess the damage done.

If you turn off the Weapon Camera to jump back to the cockpit, the Victim Camera still turns on if the target is hit.

Leave these two cameras turned on when you are showing off to friends. They provide more of those little payoffs that help make *Strike Commander* an outstanding experience. For game missions, however, the Weapon Camera is a luxury you normally can't afford. Leave it off unless you have a real purpose for watching. You almost always want the Victim Camera on to confirm destroyed targets.

Terrain in Gun Camera

With the Terrain in Gun Camera option turned on, the Gun Camera shows not only all visible targets, but also the terrain the camera is filming. Remember that the Gun Camera is a multi-functional display called up by pressing the **(F8)** key. The Terrain in Gun Camera provides a more realistic picture at the cost of possibly reducing the frame rate on slower systems.

If frame rate is an issue for your system, turning off this option is a good alternative to some other performance-related options. The lack of Gun Camera terrain does not detract in the least from the value of the camera to you and only slightly from the game's realism. The Gun Camera continues to show all possible targets, perhaps with less distraction, and this is its main function.

New pilots may want to leave this option off—it is easier to identify targets on the screen without the additional clutter of terrain.

Window Size

Window size is another frame rate-related option. Smaller window sizes can increase the frame rate on a slower system. No part of the field of view is lost, but everything you see is presented at a smaller scale with less detail. With fewer pixels to be drawn in each frame, those remaining can be drawn faster. For maximum



Figure 6-13

Flight options menu

entertainment and ease of play, go with the largest window size you can live with.

Flight Options Menu

The possible Flight options are shown in Figure 6-13. The left and right columns (Control and Panning Control) are concerned with the interface. You should be playing with a joystick or something similar, not the keyboard or mouse, or you miss much of the sensation of being a real pilot. At the bottom of the screen is a button that you can push to recalibrate your joystick if it stops responding appropriately to your pushes and pulls.

The other options are Mid-Air Collisions, Easy Landings, Show Weapons, Stalls, and Realistic (only available in the upgrade accompanying *Tactical Operations*).

Mid-Air Collisions

When the Mid-Air Collisions option is off, midair collisions cannot happen. Turning this option on makes pilot life more realistic, but only a little more hazardous, because collisions are not that common. Leave this option on.

Easy Landings

When the Easy Landings option is on, it is easier to land your F-16 without crashing. This option incurs only a very small penalty to your mission score and it can make a large difference: crashing during a landing means the entire mission must be repeated; a purist would have to start the entire game over. Make real landings to earn extra points, only if you are very experienced. Otherwise leave Easy Landings on.

Show Weapons

When the Show Weapons option is on, you can see the weapons being carried on your F-16, but only from the External Camera view (F6 key) and the Player-to-Target Camera. The *Strike Commander Technical Supplement* says you can see weapons on all aircraft but this doesn't work in early versions. This is another option for showing off to friends, but of little use otherwise. Figure 6-14 shows the underside of an F-16 carrying a variety of weapons.

Stalls

When the Stalls option is on, stalls are possible. If you want a realistic flight simulator or intend to try for a maximum score as



Figure 6-14

External Camera
view of a heavily
loaded F-16

you *Strike Commander*, then turn on the Stalls option and get used to them. If you are interested just in having fun without becoming an expert pilot, then leave stalls the Stalls option off. The scoring penalty for having it off is not high, so you can still score reasonably well without worrying about stalls.

Realistic Flight

Realistic Flight is a new option available with *Tactical Operations* that makes the flight dynamics of the F-16 more realistic. With this option on, thrust from the throttle settings is reduced and drag is more pronounced, especially when carrying many ground attack weapons. Missions are harder to complete successfully, but flying the F-16 comes closer to what flying the real aircraft is like.

Cockpit Options Menu

From the Cockpit Options menu you can select a number of options that affect the HUD, what you see outside the cockpit, the forces of gravity, and the availability of future improvements in technology. The options available from this menu are shown in Figure 6-15.

Pitch Ladder

The Pitch Ladder is a HUD feature, and is discussed earlier in Chapter 2. If you find the Pitch Ladder distracting, turn it off by pushing out the button for this option. New pilots should leave the Pitch Ladder on. If you become an expert and can keep track



Figure 6-15
Cockpit Options
menu

of the current pitch of your F-16 from other cues, then consider turning off the Pitch Ladder to reduce HUD clutter.

Tapes

The Tapes option turns on or off two of the three scrolling information tapes found on the HUD: the Airspeed Tape and the Altitude Tape. The Direction Tape at the bottom of the HUD cannot be turned off. Note that at least an approximation of the information shown on the two optional tapes is reported in digi-



Figure 6-16
HUD with optional
Airspeed and
Altitude Tapes off

tal readouts elsewhere on the HUD. Figure 6-16 shows a HUD with both tapes turned off.

If you find that you continually refer to the digital readouts and not the tapes, turn off the tapes to reduce HUD clutter. However, the direction of scroll on both tapes is a quick indicator of the direction of change in altitude or speed, and is useful information in and of itself. For example, if the Altitude Tape is scrolling downward, this tells you at a glance that you are climbing. Otherwise, you have to watch the Altitude Above Terrain readout for a few seconds to see if it is increasing to determine that you are climbing.

Auto-Targeting

When the Auto-Targeting option is off, a target must be selected manually. Pressing the **[T]** key selects the nearest target that can be attacked in your current Weapon mode. The selected target can then be tracked with special symbols on radar, on the HUD, and possibly by the Gun Camera MFD.

When this option is on, the nearest suitable target is automatically selected at the moment it is detected, even when it is out of weapon range. This can happen when a potential target first appears or at the moment you switch to a new Weapon mode. If you wish to switch targets you must do so manually, as discussed in Chapter 7.

Having this option on gives you one less task to perform in the early stages of combat. The F-16's computers can get this done while you concern yourself with other matters. Once a target is selected you can determine if this the one to go after, or switch to another.

The scoring penalty for having this option on is minimal.

360 Degree Lock

Active weapon radar on F-16s of the 1990s scans only the arc to the front of the plane. Once it has locked onto a target, the radar lock remains active only so long as the target stays within the area being scanned. If the target moves out of the cone, radar lock is lost.

360 Degree Radar is a technology of the future that maintains radar lock regardless of where the target is. When a target moves out of sight from the HUD, a diamond-X symbol appears on the HUD to indicate the direction of the target. If the diamond-X symbol appears on the right side of the HUD, the locked-on target is to the F-16's right. To get the target back in view, turn the F-16 in the direction of the diamond-X symbol.

The 360 Degree Lock option is extremely helpful for keeping track of a target that you can no longer see, especially in air-to-air combat. Target aircraft are in continual motion and their position is constantly changing. 360 Degree Lock is not as important for ground targets because they generally are fixed in place.

New pilots should turn 360 Degree Lock on. Once you are familiar with what it is telling you, experiment with it off to see if you can use camera views and other features to keep track of aerial targets.

Smart Targeting

If the Smart Targeting option is off, you can mistakenly target friendly aircraft and targets that are already shot down. Shooting down friendly aircraft hurts your score significantly and firing weapons at targets already shot down is a waste of valuable ammunition. To shoot with this option off, you must feel confident that your target is not friendly or be close enough to make visual identification.

Alternatively, turn on the Smart Targeting option. With it activated, you cannot target friendly aircraft or those already shot down. These aircraft cannot be selected by either autotargeting or manually switching targets.

Turn on the Smart Targeting option unless you are trying to maximize your score. The penalty is not trivial, but having the option on can save you from making big mistakes. You might risk turning it off on a mission-by-mission basis when you don't expect to encounter any other friendly aircraft, other than your wingman.

Sun Glare

The Sun Glare option controls the effects of the sun's glare. If the option is off and you point your F-16 directly at the sun, the sky turns completely yellow, making all other airborne objects and your HUD invisible. This can be a substantial problem if it occurs at the wrong time during a dogfight, even though with the advent of electronic sensors, attacks out of the sun are not as much of a surprise as they were in the past.

Sun glare is a distraction that you can turn off when just starting training, but having it off is not that great an advantage once you gain experience. The scoring penalty for turning off Sun Glare is minimal, but you can probably put the penalty points to better use on a more useful option.

G Effects

The *G* Effects option controls whether gravity affects you and your F-16 or not. *G* effects are discussed in detail in Chapter 15. New pilots should dispense with *G* effects when learning the basics of flying and fighting in training missions. Keep them off as well during the complete game, especially if you are not a hard-core pilot. The scoring penalty for turning them off is the same as for sun glare, and gravity is much more of a play complication.

But the effects of gravity are an important part of flying. If you turn them off, you miss much of the flight realism presented in *Strike Commander*. Turning off the effects of gravity goes a long way toward turning an advanced flight simulator into an arcade game.

Smart Radar

The Smart Radar option is discussed in more detail in Chapter 5. When on, your air-to-air radar shows a variety of different-shaped blips, depending on whether the object represented is friendly, enemy, or neutral, and if it is already shot down but still falling.

In contrast, with Smart Radar off, all airborne objects appear as undifferentiated square blips. In this case, you must make visual identification to know what each blip represents, as real pilots must.

Life is much easier for F-16 pilots when the Smart Radar is on. Having it on may make it possible to turn off the Smart Targeting option discussed above. With Smart Radar on, you can see at a glance if a selected target is a live enemy or not. If you target a friendly, neutral, or shot-down aircraft, you'll see that on the radar and can switch to a viable target.

360 Degree Radar

The 360 Degree Radar option, like the Smart Radar option, is discussed in greater detail in Chapter 5. When on, it changes the way the ground and air radar scan around the F-16 and report information to you. Normal radar looks only forward, in front of your plane. 360 Degree Radar looks all around in a circle and can help prevent unpleasant surprises from the rear.

360 Degree Radar is very useful. The radar screens are easier to read when this option is on and targets are easier to find. Unless you consider yourself a top pilot and want the highest challenges, leave this option on.

Smart RAW Scope

The Smart RAW Scope is also known as the Threat Warning Indicator, and is discussed in Chapter 4. When the Smart RAW Scope is off, the indicator picks up only the radar that is facing your aircraft. These can be airborne radar in enemy planes, or ground radar controlling anti-aircraft missiles and guns. Nearby radar that is not facing you does not show up on the scope.

When the Smart RAW Scope option is on, all radar blips within range are indicated on the scope, regardless of where they are. This is obviously useful in helping you identify the location of threats.

Having the Smart RAW Scope option on is useful and possibly appropriate for future technology. Having it on does not interfere with simulated flight, so the purist can feel much more comfortable with it, than, say, with turning off the effects of gravity.

Audio Options

The Audio Option buttons turn on and off the various audio effects of *Strike Commander* as explained in the *Strike Commander Technical Supplement*. They are a matter of choice, since there are only two sound effects that impact gameplay. First, the music changes when enemies are near, and this may be a clue that action is imminent. Second, a tone sounds when a missile is locked on. You may also be able to draw conclusions about your fellow pilots' personalities from their radio chatter. Otherwise, sounds help enhance the sensation of realism.

Effect of Game Options on Scoring

Strike Commander includes a scoring system by which you can measure your performance over the course of the game. On each mission you score points depending on several factors, including how many targets you destroy, the type of target you destroy, whether the mission objectives are met, whether neutral and friendly forces are mistakenly destroyed, and how primitive a weapon you use to score hits. You can find out your current score between missions by pressing the **[Alt] - [S]** keys. Scoring is further discussed in Chapter 15, and complete details are found in the *Strike Commander Playtesters' Guide*.

Game options that affect gameplay in some manner usually also involve a penalty of some sort on your score. For example, each target destroyed is worth so many points, depending on what the target was and what weapon was used to destroy it. This

target value is then multiplied by 100 percent minus any penalty for options in effect for that mission. If the sum of the penalties for all options in effect equals 5 percent, then the target value is multiplied by 95 percent to obtain the value of the target that is added to your score.

Saving Games

A complete *Strike Commander* game takes much longer than one game session to complete. You'll want to save your game so that you can return to it later and resume playing where you left off. You may also want to save games so that you can start over again at a certain point during the Wildcats' story, rather than starting a new game each session. You may find that one mission was particularly fun or challenging, and want to be able to fly through it again. All of these options are possible by saving games.

Games are saved in two ways. The designers of *Strike Commander* have included an autosave feature, or you may save games manually for reloading when you desire. The Auto-Save option is really a back-up option that is included as a safety device. Get in the habit of saving games regularly and not relying on the auto-save function.

Auto-Save

At the end of each mission or when you return to base, the program automatically saves your game. This saved game is immediately overwritten the next time you end a mission or return to base. When you choose the Continue Game option from the Start-Up menu, the program loads the game saved most recently by the Auto-Save function.

Relying on the auto-save function leaves you no options about trying missions over. You can't retry the mission just ended, or one that you completed several days ago.

Manually Saved Games

You can manually save games before or after each mission. Games cannot be saved during a mission. Games can be saved at either the Barracks of the Wildcats' home base or in the tent of the Wildcats' Strike Base. In both cases click on the empty bed to open the Save Game screen, seen in Figure 6-17.

To save the current game, type in a suitable DOS filename of eight characters or less and press the Save button. This adds the name of the saved game to the list of games that you can load.

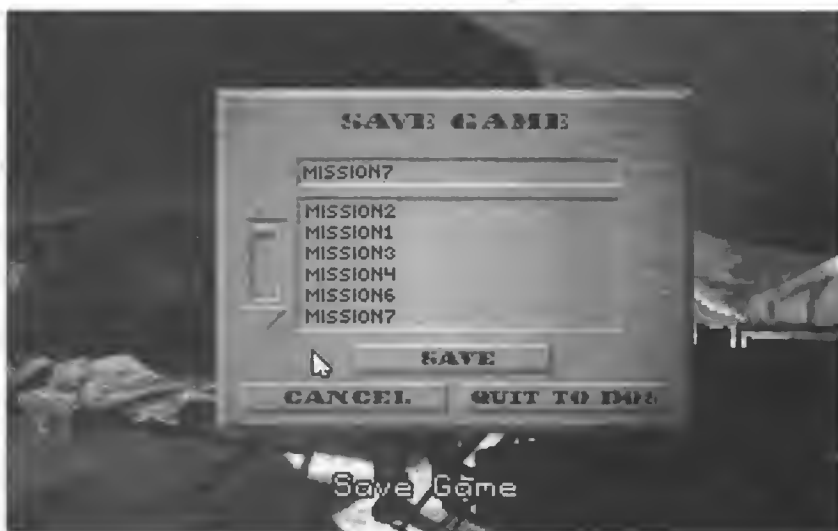


Figure 6-17

Save Game option screen

The saved game is added to your *Strike Commander* directory as file *.SAV; the asterisk represents the name you give the game. For example, if you save the game after the first mission and name the saved game MISSION1, this file is added to your directory as MISSION1.SAV. The program keeps track of the first 100 saved games.

Delete saved games from the directory by using the DOS Delete command. You may overwrite saved games by giving a new saved game the same name as an existing saved game. In this case, the program asks you if you wish to overwrite the existing game or not. Choose Yes to overwrite the older game.

After you save a game, the program automatically closes the Save Game screen and returns you to the game. To resume play without saving the game, push the Cancel button.

Time Compression

There may be times during play when you want the game to go faster but you don't want to use the autopilot to jump to the next waypoint, or you don't want to use the Configuration/Exit Game/Continue option to end a mission. Using the autopilot can put you at a mission location at an immediate disadvantage in combat. Using the Continue option incurs a scoring penalty. Time compression is an alternative to these options for speeding play.

Game time can be compressed in a burst or be set to pass more quickly. To compress game time in a burst, press the **Tab**

key. A message appears at the top of the screen noting that a time burst has occurred. Each time burst speeds up time by a factor of six. Keeping the button pressed down speeds the passage of time until the button is released.

Pressing the **[Shift] - [Tab]** keys once doubles the passage of time. A message appears at the top of the game screen noting that time compression is now 2×. Pressing these keys a second time doubles the passage of time again, so that time now passes at four times the normal rate. The message that appears tells you that time is now 4×. A third press of these keys returns time to normal passage and the message says that time is now 1×.

The messages that appear reporting time compression do not remain visible for long. When they are gone you must recall that time is compressed. Notice that the ground or sea below is rushing past when time is compressed. At the first sign of enemy activity or when you near a waypoint, return time to normal. There is little chance of being successful in combat when time is compressed.

This completes the review of game options and their consequences. You are now ready to be introduced to combat.

PREPARATION FOR COMBAT



All *Strike Commander* game missions involve combat of one type or another—usually several types at once. Wildcat pilots are expected to be proficient in air-to-air combat against any aircraft flying in the world. They are also expected to be expert ground attack pilots, capable of scoring hits with both smart weapons and unguided ones.

Success in combat depends on skill and preparation. Skill is a function of experience, acquired mainly through training missions.

Preparation for combat consists partly of loading your aircraft and flying it to the target location. If you have taken along the wrong weapons, it may be impossible to complete the mission. If you don't arrive at the proper location you can't carry out the mission either. Preparation for combat also requires knowledge. You need to know what the available weapons are capable of, so that a proper mix is taken along to fulfill mission tasks. You need to know how the weapons are operated and have some experience with them to maximize the chances of hits while minimizing wasted munitions.

On the verge of battle, you need to know how the various sensors and displays in the F-16 can help you find and select targets. All the whiz-bang gadgetry at your fingertips is so much junk if you aren't prepared to use it properly.

This chapter discusses how to prepare for combat. Napoleon is quoted as once saying that given the choice, he would prefer a general who was lucky over one who was brilliant. One secret to success in combat is being prepared to be lucky.

Weapons Available

Prior to all missions, the F-16 must be loaded with weapons. Depending on the finances of the Wildcats at the time, not all weapon types may be available, and some only in limited quantities. Knowing what the various weapons can do and what they are best suited for helps in selecting a proper mix for each mission. Weapons are divided into two major categories: air-to-air and air-to-ground. Within the air-to-ground category there are two subcategories: smart weapons and unguided ones.

Air-to-Air Weapons

The main air-to-air weapons are the Vulcan cannon and missiles. The missiles available are the AIM-9J and AIM-9M Sidewinders, and the AIM-120 AMRAAM.

Vulcan Cannon

The M61A1 Vulcan is a 20mm cannon with a rate of fire that approaches 100 rounds of ammunition per second. Every fifth round is a special type of bullet called a *tracer*. Tracer rounds have a phosphorus-like material applied to their base that burns very brightly after being fired. You can follow the trajectory of a stream of cannon rounds by watching the path marked by the intermittent tracers. Figure 7-1 shows tracers from the Vulcan cannon reaching out toward an enemy aircraft.

The Vulcan cannon is fixed to the frame of the F-16, so the gun is aimed by pointing the plane itself. You can see the tracers



Figure 7-1
Vulcan cannon
tracers

through the windscreen when the cannon fires. Because of this, the Weapon Camera does not turn on, since the rounds are already in view.

At the start of any training or game mission the Vulcan is automatically loaded with 1,000 rounds of ammunition. (In real life, an F-16 carries only about 500 rounds.) You cannot take less ammunition or leave the gun behind, but you may in effect take extra gun ammunition by turning on the Unlimited Ammo option (see Chapter 6).

According to the *Strike Commander Playtesters' Guide*, the maximum effective range for the Vulcan cannon is about 1,000 meters, or 3,000 feet, or 0.5 nautical miles. The gun has little chance to be effective unless the range is 0.5 nautical miles or less.

The effectiveness of the weapon falls off as the rounds reach maximum range. Gun damage is caused by the force of high-velocity rounds hitting structural features. The further the rounds travel before hitting, the lower their velocity and the less damage caused. The gun does a minimum of damage at a range of 0.5 nautical miles. Damage doubles at a range of around 0.3 nautical miles, and closer still the damage caused can triple.

The Vulcan is primarily an air-to-air weapon. It is activated when you select the Dogfight Weapon mode (DGFT on the heads-up display, or HUD). It is the most inexpensive weapon to use and thus very popular with the accountants. If you can clear the skies with the Vulcan, a lot of money can be saved. However, being effective with the Vulcan requires a high level of pilot skill because you must get close to the enemy and be in a good position to shoot. Using the gun in air combat is discussed further in Chapter 9.

AIM-9J Sidewinder

The AIM-9J is an air-to-air missile that is controlled by an infrared guidance system, or heat seeker. The AIM-9J available to the Wildcats is old technology that requires a very hot image on which to focus. For this reason they are normally effective only when aimed at the rear of a target, so they can home in on the jet engine exhaust. The AIM-9J is activated in Short-Range Missile Weapon mode (SRM). Figure 7-2 shows an AIM-9J in flight from the Weapon Camera.

The AIM-9J has an effective range of 5,000 meters, or 2.5 nautical miles on the Range-to-Target readout in the HUD. When a selected target is within range of the missile, the IN RNG message appears on the HUD (only if the HUD is in close zoom).



Figure 7-2

Weapon Camera
view of an AIM-9J
Sidewinder

The AIM-9J is often frustrating to use because it can easily lose its target lock or be distracted by flares. However, it has an effective range five times that of the Vulcan and is relatively cheap at \$30,000 each.

AIM-9M Sidewinder

The AIM-9M is another heat-seeking air-to-air missile, but it is an improvement over the 9J in every meaningful characteristic. It is faster, turns tighter, has a bigger warhead, and has a longer range. Most importantly, its infrared guidance system is much more sensitive and can pick up images from all aspects, not just the engine exhaust from an opponent's rear. The AIM-9M is also activated in Short-Range Missile Weapon mode. Figure 7-3 shows the Weapon Camera view of an AIM-9M Sidewinder on its way toward a target.

The AIM-9M has an effective range of 8,000 meters, or 4.0 nautical miles on the Range-to-Target readout in the HUD. When a selected target is within range of the missile, the IN RNG message appears on the HUD (only if the HUD is in close zoom).

The AIM-9M is preferable to the AIM9J, but is not without limitations. It too can lose target lock or be distracted by flares. The longer range at which it can be fired can also be a detriment. At longer range, an opponent has more time to evade.

The AIM9M is twice as costly as the AIM9J, at \$60,000 each.

AIM-120 AMRAAM

The AIM-120 is an advanced, medium-range air-to-air missile (AMRAAM) that is controlled by a radar guidance system. It is



Figure 7-3

Weapon Camera
view of an AIM-9M
in flight

the latest development in air-to-air missile technology and everyone's weapon of choice. The AIM-120 can be fired at the enemy from relatively far away and then forgotten about, because the missile's own radar guidance takes it to the target unless the opposing pilot is able to evade. A kill can be scored without the victorious pilot ever getting close to danger.

The AIM-120 is activated in Medium-Range Missile Weapon mode (MRM). Figure 7-4 shows a Weapon Camera view of an AIM-120 AMRAAM missile.

The AIM-120 has an effective range of 45,000 meters, or 23 nautical miles on the Range-to-Target readout in the HUD. When



Figure 7-4

Weapon Camera
view of an AIM-120
AMRAAM missile

a selected target is within range of the missile, the IN RNG message appears on the HUD (only if the HUD is in close zoom).

The AIM-120 is a devastating standoff weapon. However, if fired at too far a distance, an enemy can turn and run, possibly outdistancing the missile. It can also be outmaneuvered or decoyed by highly skilled pilots. The big drawback to the AIM-120 is that it is very costly at \$200,000 each. In the third *Strike Commander* mission, conducted in Mauritania, you have the opportunity to capture a small supply of AIM-120s. For many missions, firing off a few AIM-120s can turn an otherwise profitable exercise into a financial loser.

Air-to-Ground Weapons

There are a variety of ground attack weapons available to the Wildcats, including 500 pound bombs, cluster bombs, Maverick missiles, 3 inch rockets, smart bombs, and a special bomb for causing craters. In addition, the Vulcan cannon can be used in emergencies for ground strafing.

The Wildcats prefer the less expensive weapons to keep their finances in the black, but these weapons generally require greater pilot skill.

Also remember that ground attack weapons interfere with the aerodynamics of the F-16 and increase its drag. Carrying numerous ground attack weapons slows the F-16 and reduces its maneuverability. If you stumble into an air battle while heavily loaded and you are playing with the Realistic Flight option from Tactical Operations, consider jettisoning all or some of your ground weapons, as explained in Chapter 5. If not in Realistic Flight mode, the program hardly penalizes your keeping a heavy load on.

Mk82 General Purpose Bomb

The Mk82 is a 500 pound iron bomb little changed from World War II. It is an uncomplicated weapon. You simply drop it and watch it fall unguided until it explodes on impact. However, a number of innovations have been developed to improve the aiming of this bomb and, thus, its effectiveness. Figure 7-5 shows a Weapon Camera view of a Mk82 bomb dropping toward a target.

The Mk82 is released in salvos, or sticks, two bombs at a time, and can be used in either CCIP or CCRP Weapon mode, as explained in Chapter 11. The difference between the two is that the CCIP mode tells you when to release bombs to hit a certain point, and the CCRP mode releases the bombs at the



Figure 7-5

An Mk82 bomb
dropping toward a
target

correct moment to hit a point that you have already selected.

This weapon provides a lot of bang for the buck, being more powerful and less costly than most other ground attack weapons. It is only slightly less powerful than the specialized Durandal bomb, and at one-third the cost. It is roughly one-fourth as powerful as the GBU smart bomb but costs 90 percent less. In addition, you can carry many more Mk82s than you can of more sophisticated weapons, as explained below in the section on Loading Weapons.

Use the Mk82 against large targets—they're easier to aim at and require a lot of damage before being taken out. Suitable Mk82 bomb targets are oil tanks, hangars, runways, bunkers, buildings, aircraft carriers, destroyers, and tankers.

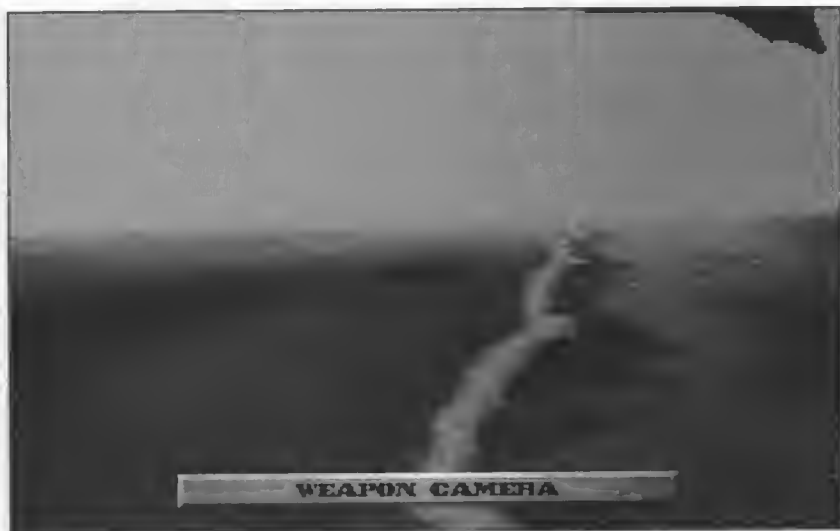
Mk20 Rockeye Cluster Bomb

The Mk20 cluster bomb is a large shell casing containing over 200 individual bomblets inside. The cluster bomb is fused to break open at a suitable height, spreading the individual bomblets over a 200×250 foot area. Every nonarmored object within that area will probably be destroyed. Even tanks and other armored vehicles can be destroyed if a bomblet strikes an unprotected area like a tank engine cover. Figure 7-6 shows a Mk20 cluster bomb in flight.

The Mk20 is also released in salvos, two bombs at a time, and like the Mk82 can also be used in either CCIP or CCRP Weapon mode, as explained in Chapter 11. The Mk20 bomb costs twice as much as the Mk82 bomb.

The Mk20 cluster bomb is an area attack weapon, useful against small targets standing alone or in groups. It covers a much

Figure 7-6
Mk20 cluster bomb
in flight



wider area than do more precise weapons, but exerts less destructive force. The cluster bomb is useful against targets that require only a minimum of damage to be knocked out, but are too small to be hit with precision or too insignificant for expensive smart weapons. Suitable bomb targets for the cluster bomb are groups of vehicles, radar installations, surface-to-air missile (SAM) launchers, anti-aircraft guns, small buildings, and hangars.

The Mk20 cluster bomb has no effect against runways.

LAU-3 Rocket Pod

Each LAU-3 rocket pod contains 19 individual 3 inch rockets. The rockets are fired in salvos, one rocket simultaneously from each pod onboard, and then fly unguided until impact. If you carry six pods, you fire six rockets per salvo. When a rocket strikes the ground or a target, it explodes with a force roughly one-twelfth that of an Mk82 500 pound bomb. It must hit the target to cause damage. Near misses have little effect.

The *Strike Commander Technical Supplement* implies that you can fire entire pods of rockets at one time, which would give rockets a large area affect, similar to the cluster bomb. This is not correct. Each salvo is made up of one rocket per pod. You can fire salvos one after another, but during the approach to a target you may only be able to get off four to six salvos before flying past. Remember to have the Weapon Camera turned off if you mean to fire several salvos of rockets during the strafing attack.

Rockets are activated in the Strafe Weapon mode (STRF). Their use in combat is discussed in Chapter 10.

Rockets travel to a range of roughly 4,000 meters, or 2 nautical miles, before their fuel expires, but their effective range is only 3,000 meters, or 1.5 nautical miles. Beyond this point they start to fall and no longer fly as aimed.

Rockets are inexpensive ground attack weapons. A pod of 19 costs the same as one Mk82 bomb. They are somewhat limited because they are unguided. Once launched, they are out of your hands. You aim them by aiming your plane, which puts a premium on flying skill for effective use.

They have some advantages in return. For their cost you get a lot of firepower. Pods are purchased in pairs, giving you 19 salvos of two rockets each. That's a chance to hit 19 different targets, versus hitting one target with the same cost in Mk82s. A pilot who is accurate with rockets can take out a lot of ground targets with that firepower, for relatively low cost.



If a rocket pod is not emptied during a mission, it is refilled at no extra cost and returned to inventory when you return. This is a good reason not to fire off your rockets indiscriminately and a way to save a little on squadron finances.

The advantage of rockets over the Vulcan for strafing is their 3,000 meter range, which allows some standoff capability. Against antiaircraft guns on land or on ships, for example, rockets can be launched outside the range of the guns, leaving you time to break away without drawing fire. To use the Vulcan in this case, you'd have to close within the enemy's gun range in order to strafe.

Rockets are useful against small targets that can be knocked out with one salvo, such as vehicles, SAM launchers, antiaircraft guns, radar installations, and small buildings. They can damage large targets, such as large buildings, bunkers, and ships, but these targets would have to be hit many, many times with the relatively weak rockets to be knocked out. For example, it may take nearly 35 rocket hits (18 salvos or two rockets) to blow up a supertanker, and four times that many to blow up an aircraft carrier. Rockets are not effective against runways.

For the daring or desperate, rockets can be used against aircraft, but there is a very low probability of scoring a hit. Air-to-air rocket attacks are discussed in Chapter 8.

AGM-65D Maverick

The Maverick is a fire-and-forget ground attack missile that locks on and guides itself into the target by infrared imaging. The Maverick is a superb standoff weapon, useful against difficult and

Figure 7-7
AGM-65D Maverick
missile in flight



dangerous targets while allowing you to keep your distance. Using the Maverick in ground attacks is discussed in Chapter 12. It is activated in the Infrared Weapon mode (I-R). Figure 7-7 shows a Maverick missile headed for its target.

The Maverick has an effective range of approximately 6,000 meters or 3 nautical miles. When the missile is within range of the selected target, the IN RNG message appears on the close-zoom HUD. If launched within range of a selected target, the Maverick has an excellent chance of scoring a hit.

The destructive force of a Maverick missile is about two-thirds that of the Mk82 bomb. This makes it somewhat less useful, and it is expensive, costing ten times as much as the basic bomb. The strong points of the Maverick are that it is extremely accurate and it can be fired from a distance, allowing the F-16 to turn away.

The Maverick is best used against SAM launchers, ZSU-23/4 anti-aircraft vehicles, anti-aircraft guns, gun radar, warships, and bunkers. Warships probably need more than one Maverick hit to blow up. Mavericks are also useful in taking out one target within a heavily defended area when you don't have the time or resources to suppress all anti-aircraft missiles and guns first, to make the bombing runs safe from fire. Mavericks can be used against almost any ground target, but their cost makes them a prohibitive choice for easier targets such as non-anti-aircraft vehicles and nonfortified buildings. They are ineffective against runways.

GBU-15(V)/B Smart Bomb

The GBU-15 is a 2,000 pound smart bomb that guides itself as it glides downward onto a designated target. In *Strike Commander* the GBU-15 uses an infrared guidance system that controls its flight. Fins on the body provide enough aerodynamic stability to allow effective nonpowered flight for 6,000 meters, or 3 nautical miles. Using the GBU15 in combat is discussed in Chapter 12. Figure 7-8 shows a GBU-15 bomb gliding toward its target.

The GBU-15 is activated in the Infrared Weapon mode (I-R). When the bomb is within range of the selected target, the IN RNG messages appears on the close-zoom HUD. This is another fire-and-forget weapon: when within range of the target, you can release it and turn away before closing with the target itself.

The destructive force of the GBU-15 bomb is more than three times that of the Mk82 bomb. It is the most powerful individual weapon that the F-16 can use against a ground target. In addition, it is extremely accurate and can be dropped with relative safety. As you might expect, it is expensive, costing as much as a Maverick, and it is big. The F-16 can carry only a few.

The GBU-15 is best used against big targets: bridges, large buildings, and large ships. One is enough to take out most ships, but an aircraft carrier may take as many as three GBU-15s to blow up. They are also useful for destroying a target within a heavily defended area, because of their standoff capability. They can be used against any ground target, but remember their cost

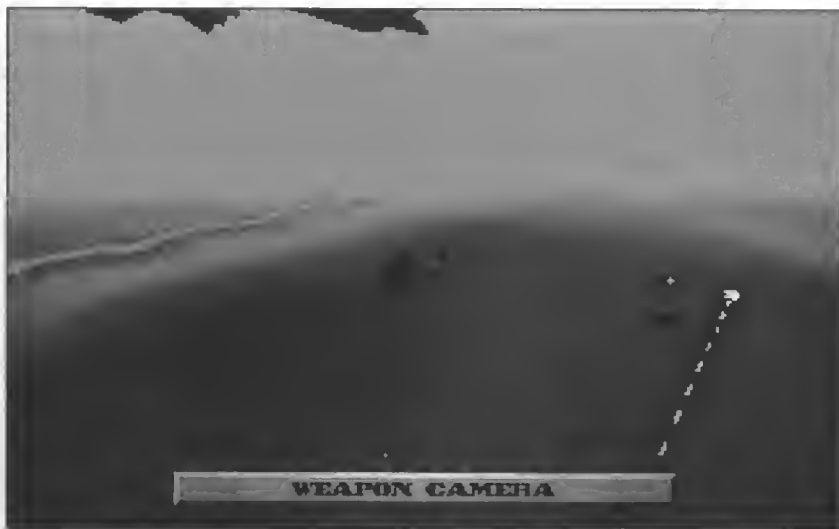


Figure 7-8
GBU-15 smart
bomb gliding
toward a target

when you are tempted to use them against small targets. They can't be used against runways, because there is no heat source for the infrared imaging system to focus on.

Durandal Runway Cratering Munition

The Durandal bomb is a French design intended to pierce the hard surface of a runway and explode in the ground below, heaving up large sections of the pavement. A Durandal crater requires heavy equipment and considerable time to repair. Durandal bombs make runways unusable, at least temporarily, and are an effective part of an air superiority campaign. Aircraft stuck on the ground at a damaged runway can't get into the air, and may be susceptible to bombing attacks.

The Durandal bomb is dangerous to drop because the pilot must fly over the runway at a relatively slow airspeed. From a height of least 75 meters the bomb is dropped and a parachute on the weapon opens. This orients the bomb straight down. When the bomb reaches this position, a rocket is ignited, firing the weapon down and through the concrete. A delayed-action fuse sets off the bomb after it passes into the ground below. Figure 7-9 shows a Durandal bomb shortly after release, with the parachute deploying.

The Durandal bomb is a nonguided bomb dropped one at a time. It is activated in CCRP Weapon mode only. The technique for effectively dropping the Durandal bomb is discussed in Chapter 11.

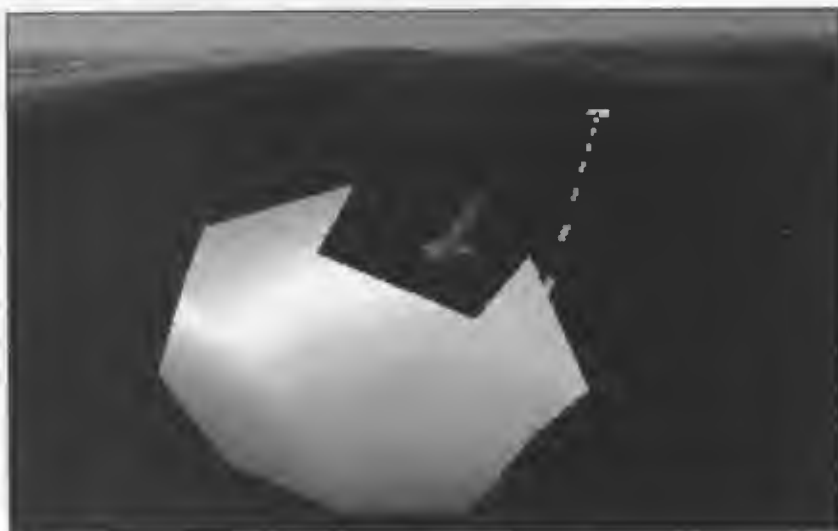


Figure 7-9

Durandal runway
bomb deploying its
chute

The explosive force of this bomb is slightly larger than that of the Mk82 bomb, but it has a smaller blast radius. Because it normally explodes in the ground, it must be directly over the target to be effective. It can be used against hardened bunkers or any other fortified position that you want to penetrate from the top. It can get through 16 inches of concrete, or the equivalent.

The Durandal bomb is not particularly effective against other types of targets because of its specialized nature. It costs three times more than an Mk82 bomb.

Vulcan Cannon

The Vulcan cannon can also be used for ground attack, but it's dangerous and requires expert pilot skill. The gun is ready for air-to-ground attacks when it is activated in the Strafe Weapon mode (STRF on the HUD). To cause strafing damage with the Vulcan you again must be close to the target and in a dive to aim at a target on the ground. The window for effective gun strafing is open only for a second or two and then the F-16 must pull out to avoid crashing. Using the Vulcan for ground attacks is discussed in Chapter 10.

If you are skilled enough to take out ground targets with the Vulcan you will become very popular with the accountants, because all other ground attack weapons are costly, even simple bombs. Try cannon strafing in a training mission, however, before attempting it during a game mission.

Loading Weapons

Weapons must be loaded onto your F-16 before every mission, even training missions. Weapons are put on the F-16 at the Weapon Loading screen, shown in Figure 7-10. The weapons available are spread out in front of the aircraft. Moving the joystick pointer over the various weapons reveals the name of each and the number available in the squadron inventory. During *Strike Commander* game missions, some weapons may not be available, and most only in limited quantities.

To load a weapon on the F-16, click on it where it sits on the dollies in front of the aircraft. This places two of the chosen weapon on the F-16, one under each wing. Weapons are loaded two at a time. To take a weapon off, move the joystick pointer under the wings until the name of the weapon you wish to remove appears. Click on that spot and a pair of the weapons are removed from under the wings and returned to inventory.

Figure 7-10
Weapon Loading
screen



The number and types of weapons the F-16 can load are limited, even when all weapons are available in quantity—a rare situation for the Wildcats. The F-16 has four places, called hardpoints, on each wing to which weapons can be fixed. Certain hardpoints can mount only certain types of weapons. The number of weapons that can be loaded depends on both the hardpoints available and the weapon you wish to carry.

Weapon Hardpoints

Hardpoints are structures on the underside of the F-16's wings to which weapons can be attached. Hardpoint structures include electronic and mechanical connections that hold the weapon until needed and allow transmission of your launch signals.

Starting from the outboard end of the wing, the four F-16 hardpoints are the wing tip rail, a light hardpoint, a medium hardpoint, and a heavy hardpoint. Hardpoints nearest the fuselage of the aircraft are the strongest and can carry the heaviest loads.

Wing Tip Rail

The wing tip rail is the weakest hardpoint. It can mount only one Sidewinder missile, either an AIM-9J or AIM-9M. This is contrary to the real-world F-16, which can also carry an AIM-120 out here.

Table 7-1 Medium Hardpoint Maximum Loads

Weapon	Maximum Load
AIM-9J	1
AIM-9M	1
AIM-120	2
Mk82	6
Mk20	6
LAU-3 rocket pod	2
Maverick	3
GBU-15	1
Durandal	3

Light Hardpoint

Second in from the wing tip, the light hardpoint is still relatively weak. Like the wing tip rail, it can mount only one air-to-air missile, either a Sidewinder or an AIM-120 AMRAAM.

Medium Hardpoint

Third in from the wing tip is the medium hardpoint, which is the most versatile on the F-16. It can carry any weapon. The maximum number of each weapon that can be mounted on a medium hardpoint is shown in Table 7-1.

Heavy Hardpoint

The heavy hardpoint is the one nearest the fuselage of the F-16. It can mount the same weapon loads as the medium hardpoint, shown in Table 7-1, except that it cannot mount air-to-air missiles.

F-16 Weapon Limits

Assuming that all weapons are available in sufficient quantities and you only wish to load one type, Table 7-2 shows the maximum number of that type weapon that the F-16 can carry.

Choosing Weapon Mode

Weapon mode determines two important precombat conditions of your F-16: the weapon currently activated and the type of radar

Table 7-2 Maximum F-16 Carrying Capacity of for Each Weapon

Weapon	Maximum Capacity
AIM-9J	6
AIM-9M	6
AIM-120	6
Mk82	24
Mk20	24
LAU-3 Pod	8
Maverick	12
GBU-15	4
Durandal	12

that can be turned on. Both conditions can be important. Having the wrong weapon activated means that valuable time is wasted as you cycle through the options until a suitable weapon is ready. Having the wrong radar operating, or no radar operating, means that you may be slow in finding, identifying, and selecting targets.

Weapon mode is discussed in Chapter 2. When any weapon is activated, a Weapon mode is also activated on the HUD to help aim the weapon and fire it at the appropriate time. The weapon and mode selected determine what you can fire immediately. Figure 7-11 shows an F-16 in Short-Range Missile Weapon mode (SRM). An AIM-9J is activated and ready to fire. In this mode the HUD is ready to report target lock-on and cue the pilot when the target is within missile range. The air-to-air radar MFD can be activated if desired, because the Weapon mode is an air-to-air combat mode.

You'll control most of your weapons in one Weapon mode. The exceptions are the Vulcan cannon, which can be controlled in Dogfight mode or Strafing mode, and the Mk20 and Mk82 bombs, which can be controlled in either CCIP or CCRP modes.

Sudden combat is a possibility at all times in the world of *Strike Commander*. Throughout any mission keep your F-16 in an appropriate Weapon mode so you can respond quickly to a new threat. During an air battle, change to Air Combat Maneuver mode to make it easier to switch to air-to-air weapons. This mode is discussed later in the chapter. Learn how to change Weapon mode quickly if an unexpected threat appears.

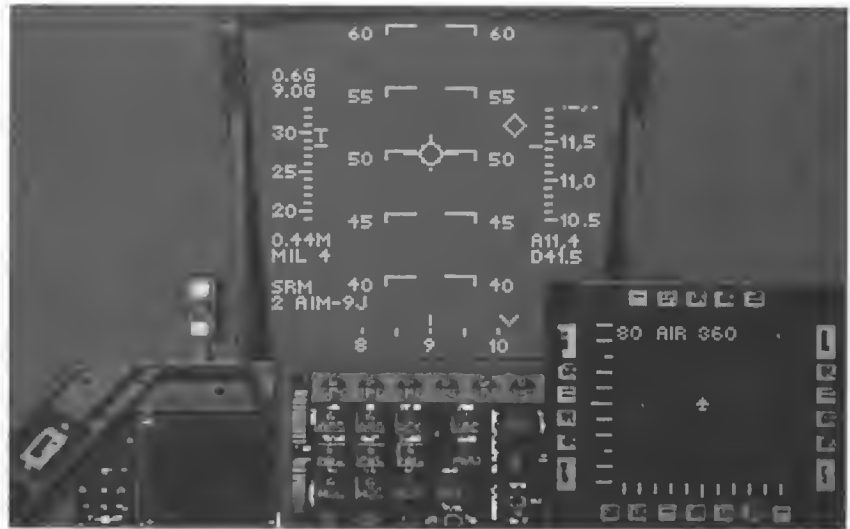


Figure 7-11

F-16 in Short-Range
Missile Weapon
mode (SRM)

Appropriate Weapon Mode

The appropriate Weapon mode at any moment depends on what weapons you have available, your best guess about possible threats, and the tactical situation.

Obviously you cannot activate weapons that you aren't carrying, but you may have several alternatives from which to choose. For example, if the most likely threat is another aircraft, you might have one or more types of air-to-air missile along, as well as the Vulcan cannon. Or, approaching an enemy base believed to be defended by antiaircraft guns, you may have along Mk82s, Mk20s, and rockets as alternative weapons.

A general rule for choosing an appropriate Weapon mode is to activate the weapon that is capable of taking out the most likely threat while minimizing the risk to you. For example, during the flight toward a target location, the most likely threat is interception by enemy aircraft. An appropriate Weapon mode for responding to this likeliest threat is a long-range air-to-air missile, if available. If you are carrying the AIM-120, activate it. If an enemy aircraft appears, the AIM-120 can be fired at a long range, possibly before there is any risk to you.

In this example the Vulcan cannon in Dogfight mode is the least appropriate weapon to activate because it has the shortest range of any air-to-air weapon. To use it against an aircraft, you must close with the enemy, perhaps running a gauntlet of enemy missiles to do so. The Dogfight mode does give you the option of turning on air-to-air radar, but so do any of the air-to-air missiles.

As you approach a group of ground targets, the same factors influence the choice of Weapon mode. For example, assume that no enemy aircraft are expected over the ground targets (a risky assumption in *Strike Commander*), and the defenses are SAMs and antiaircraft guns. An appropriate weapon for the approach to this target area is something that can knock out the SAMs and guns with minimum risk to yourself.

The Maverick is probably the best choice, followed by rockets. Both have some standoff capability, allowing you to fire without flying too close to the enemy antiaircraft positions, or even over them. The Mk82 and Mk20 bombs require flying directly over the targets, which is very dangerous. Strafing antiaircraft guns with the Vulcan cannon is even more dangerous.

One additional factor affecting the choice of Weapon mode prior to combat is the cost of the weapon. For example, the AIM-120 is an effective long-range missile, but it is very expensive. If you know your opponents are likely to be poor pilots or older-generation aircraft, the expense of the AIM-120 makes it a bad choice. Your opponents in this case can probably be taken out with much cheaper alternatives.

The same holds true on the ground. Although the Maverick is a good choice against mobile and fixed SAM launchers, rockets are much more cost effective against antiaircraft guns. The SAM launchers are a long-range threat, worthy of being knocked out quickly with the relatively expensive Maverick. But guns have a limited range. Snipe at them with rockets and break away before they can reach you. Even taking several passes to knock them out is much cheaper than expending a Maverick on them.

Changing Weapon Mode

If you find yourself in an inappropriate Weapon mode, switch to something more useful as quickly as you can. Press the **[W]** key to cycle through all available weapons.



*When changing weapons, be careful not to press the **[Shift]** - **[W]** key to cycle backward through the weapons as suggested on page 60 of the Strike Commander Technical Supplement. These keys jettison all air-to-ground weapons instead, as noted on the Strike Commander Reference Card. Contrary to the documentation, there is no way to cycle backward through the weapons.*

During an air battle, press the **[G]** key to switch immediately to the special Air Combat Maneuver mode (ACM). If you happen to have an air-to-ground weapon activated when you press

the **[G]** key, the Vulcan cannon is automatically activated in Dogfight Weapon Mode. To get out of ACM Mode and return to the Normal Mode from which air-to-ground weapons can be activated, press the **[G]** key again.



*If you already have an air-to-air weapon activated other than the Vulcan, pressing the **[G]** key does not activate the cannon, as implied by the Strike Commander Technical Supplement. The air-to-air weapon already active remains so. You must press the **[W]** key to cycle through available air weapons to activate the cannon in this case. Pressing the **[G]** key does turn on ACM mode regardless of what weapon is active at the time.*

Air Combat Maneuver Mode

Air Combat Maneuver mode is special Weapon mode useful in air combat. It has two main functions. First, if a ground attack weapon is active, pressing the **[G]** key immediately activates the Vulcan cannon instead. This can save time when you need to switch quickly to Dogfight mode. Second, so long as you remain in ACM mode, pressing the **[W]** key only cycles through other air-to-air weapons, ignoring all ground attack weapons that normally would be cycled through as well. This can save time when you wish to quickly activate a missile. With ACM mode on, pressing the **[W]** key once, or a few times at the most, activates the missile you want.

When you are in ACM mode, the notation ACM appears in the top left of the Weapons MFD. Figure 7-12 shows a Weapons

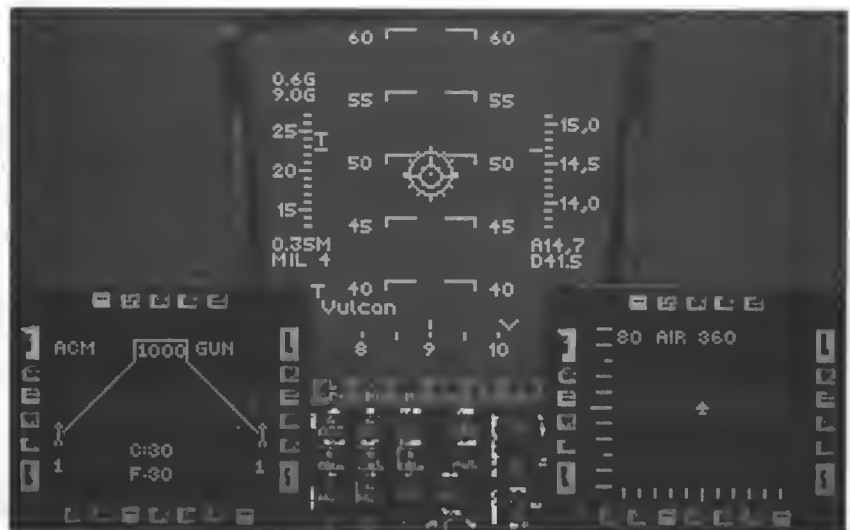


Figure 7-12

Weapons
Hardpoint MFD
indicating Air
Combat Maneuver
mode

Hardpoint MFD in ACM mode. Once in ACM mode, you must press the **G** key again to return to Normal mode. When in Normal mode, the notation NORM appears in the top left of the Weapons Hardpoint MFD and you can once again activate all weapons.

Approaching Combat

With the proper weapons loaded and an appropriate Weapon mode turned on, you're prepared for combat. Don't waste this preparation by making mistakes on the approach that give advantages to the enemy.

Approach an area expected to be hostile at a modest speed, giving yourself time to detect enemies at long range and meet them on your terms. Don't use the autopilot to fly into a battle. This puts you into the action too quickly, without enough time to understand the situation. On the defensive immediately, you may never regain the offensive.

To speed play between waypoints, use instead the Time Compression options discussed in Chapter 6. As you approach within 10 nautical miles or so of the waypoint, return time compression to normal.

Plan your approach to best fit the situation you expect to encounter. If you anticipate an air battle, approach high, at 35,000 feet. This provides fuel economy on the way in and plenty of room underneath for maneuvers. The program usually places enemy aircraft in relation to you. If you come in low, the enemy appears low. If you feel more comfortable fighting on the deck, then come in low.

If the mission is a ground attack and no enemy air cover is expected, come in around 2,000 feet or perhaps lower, ready to use Mavericks or rockets on SAMs, radar, and guns. If the situation is unknown, come in high, anticipating the most dangerous situation—air combat. You can always pull off and come back in low to get those ground targets.

During the approach to an air battle, attempt to identify the most dangerous enemies and take them on first. Your Threat Warning Indicator can tell you which aircraft are the most sophisticated, and probably most dangerous. When identical aircraft approach in pairs, assume the lead pilot is the better one, and go after him first.

The key to any ground attack mission is knocking out all antiaircraft threats first. After they're gone, the rest is a turkey shoot until your ammo runs out. As you approach ground tar-

gets, make a mental map of where antiaircraft weapons are. It may be possible to get to the real targets by knocking out only part of the defenses and keeping away from the rest, or by avoiding the air defenses all together.

Never leave two MFDs on at the same time. The second display covers the Missile Warning Lights and these have to be visible so long as there is any threat of a missile attack. The Missile Warning Lights, are discussed in Chapter 4.

Finding the Enemy

The first step in finding the enemy is to follow the plan outlined in the mission briefing. Each *Strike Commander* mission includes a briefing that outlines the objectives and the order in which they are intended to be met. The NAV map is a prompt for objectives, marking waypoints that follow the sequential legs of the mission. In most cases, the enemy can be expected where the mission briefing says they will be. In a few cases, there are surprise ambushes to deal with.

Once in the vicinity of the enemy, use the gadgetry of the F-16 and your own eyes to locate targets. The principal tools of the F-16 for finding the enemy at long range are the Threat Warning Indicator and the two types of radar, air-to-air and air-to-ground. As the range closes, these displays are still useful when the enemy is out of sight.

Once the range closes, you are no longer preparing for combat, but in it. Keeping track of the enemy at close quarters presents its own problems, discussed in later chapters.

Threat Warning Indicator

The Threat Warning Indicator (TWI) is an early warning device that picks up the signals of enemy radar searching the sky. This indicator is also known as the RAW Scope. The presence of radar is marked on the indicator, giving an early warning and rough location of a possible threat.

A description of the Threat Warning Indicator and how it works is presented earlier in Chapter 4.

The Smart RAW Scope option improves the ability of the indicator to see enemy radar. How to use this option is discussed in Chapter 6.

The TWI often provides the earliest warning of enemy threats, and has the advantage of reporting both air and ground radar. From this indicator you can learn something about the source of the radar, including whether it is air or ground based, how

sophisticated it is, the heading of the threat, the relative distance, and the type of SAM being controlled. Once a threat appears on the TWI, turn on the appropriate radar to begin learning more about the potential enemy.



During the approach to combat, zoom in the HUD so that the Threat Warning Indicator shows the detailed icons of radar sources. From the detailed icons you can learn more information about the radar source.

Air Radar

Once an aircraft threat has been picked up on the TWI, turn on the air-to-air radar to watch it more closely, especially as you close with it and if there are several aircraft in the sky. Radar is useful primarily for distinguishing between targets and helping to find them when they are not visible through the windscreen. If you are engaging only one target, then turn on the Single-Target Tracking Radar to pick up more information about it. If more than one aircraft needs to be watched, stay in Multiple-Target Tracking radar.

How to read and use air-to-air radar is discussed in Chapter 5. Radar roughly reports the heading and distance of threats, and helps track selected targets. Depending on what game options are being used to enhance the radar, it can also distinguish between enemy aircraft and nonthreats, and show threats from every point on the compass, not just to your front. These options are the Smart Radar and 360 Degree Radar, explained in Chapter 6.

As the range to air threats closes, radar can be reduced in scale to help keep the position of friends and enemies separate. In a swirling dogfight, known to pilots as a “fur ball,” magnified radar can be helpful in determining the location of enemies that can’t be seen easily.

Using the air-to-air radar in combat is discussed in more detail in Chapter 8.

Ground Radar

Ground radar also helps find and distinguish potential targets. It can be critically important because it picks up all targets, not just those emitting radar signals. Only a few ground targets actually use radar and the rest do not appear as threats on the TWI. When all enemy ground radar has been knocked out, the best way to find ground targets is with ground radar.

The limitations of ground radar are that it doesn’t distinguish between types of targets or targets that have been destroyed. To

help with this identification, consider turning on the Gun Camera MFD, discussed in Chapter 5.

Ground radar can be magnified to help find a desired target among several. Ground radar can also be enhanced by the 360 Degree Radar option, discussed in Chapter 6.

Using ground radar in combat is discussed in Chapter 10.

Selecting a Target

The final step in preparing for combat is selecting, or designating, a target. This can be done automatically, when the Auto-Targeting option is turned on (see Chapter 6,), or manually by pressing the **[T]** key. In either case, the closest suitable target is selected, when possible.

The designated target is marked with a visible glint of light that can be seen through the windscreen. In some cases the glint disappears and is replaced by a Designated Target Box when the target is within the HUD. Selected air targets are also marked on air radar.

The selection of a target completes the preparation for combat and begins the battle.

Air-to-Air Targets

Selected air targets are marked on the HUD with the Designated Target Box, as shown in Figure 7-13. On the air-to-air radar screen, their radar blip is placed in brackets.



Figure 7-13
Designated Target
Box marking a
selected air target

Ground Targets

Ground targets can be selected electronically only if within radar range. Also, the activated weapon must be one of the two smart weapons (the Maverick or the GBU-15) or the Vulcan cannon activated in Strafing mode (STRF). In Infrared mode, the target is marked on the Gun Camera screen with a fixed cross-hair. Designated ground targets are not marked on the ground radar in any way.

For most ground attack weapons other than smart weapons, targets are not selected electronically. In these cases, select the target visually and aim weapons at it. Radar and the TWI help find the targets but you attack them using only the aiming aids on the HUD.

AIR-TO-AIR MISSILE COMBAT



Air-to-air combat takes place in every mission of *Strike Commander*. In many cases, you cannot proceed to the real mission objectives until enemy air cover has been destroyed. Even when a mission appears to be finished, there can be air ambushes on the way home. As a Wildcat pilot you must be a proficient air-to-air fighter or your career will be a short one.

Air combat is conducted with two categories of weapon: guns or missiles. We discuss air gun combat in Chapter 9. In this chapter we talk about using missiles against enemy aircraft and avoiding missiles fired at you by the enemy.

The F-16 can carry three different missiles for air combat: two types of short-range Sidewinder and the medium-range AMRAAM missile. All three have different characteristics and abilities. You need to understand how they work, how they are controlled, and the best tactics for using each. Missiles are expensive and the Wildcats can't afford to waste them.

The discussion about missile combat begins with a look at the missile combat HUD. A number of additional readouts and symbols appear on the HUD when you are in a missile Weapon mode and you need to be familiar with them to use missiles effectively.

Next we discuss how to acquire a target for a missile attack. Missiles are just dead weight on your wings if you can't lock on to a target.

A short discussion is also included about using ground attack rockets in air combat for those aspiring Wildcat pilots who are really penny-pinchers or caught with their weapons down. Rockets are unguided missiles and have a low probability of hitting an airborne target, but they may be your weapon of last resort.

The chapter ends with a discussion about avoiding enemy missiles. A Wildcat pilot sees plenty of these on every mission and each one has the potential to end a promising career. You need to recognize what the difference is between enemy missile types and how to keep from being hit by them.

The Air-to-Air Missile HUD

The Weapon modes for missile combat are Short-Range Missile (SRM) and Medium-Range Missile (MRM). The HUD is automatically put in SRM Weapon mode when either the AIM-9J or AIM-9M Sidewinder missile is activated. The HUD is in MRM Weapon mode when the AIM-120 AMRAAM missile is activated.

Figure 8-1 shows the HUD in SRM Weapon mode with an AIM-9J activated and a target selected. For both SRM and MRM Weapon modes, a number of additional readouts and symbols appear on the HUD to help you make effective use of missiles. These are the Designated Target Box, the Diamond-X, the In Range message, the Range-to-Target readout, the Closure Rate readout, and the Target Aspect Angle Circle and Caret. Note that none of these combat readouts appears if a target is not selected. If a selected target is lost for any reason, the combat readouts disappear. Selecting a target is discussed in Chapter 7.



Figure 8-1

The HUD in Short-Range Missile mode

To better follow the discussion about using the HUD in air-to-air missile combat, set up a dogfight training mission against a Lear jet and load all three types of air missile. Load the AIM-9J first, then the AIM-9M, and finally the AIM-120. When the mission starts, activate the AIM-9J by pressing the **[W]** key once.

If you have the Auto-Targeting option on, the Lear jet is automatically selected as your target. If not, press the **[T]** key once. Immediately pause the game by pressing the **[Alt] - [P]** keys and read on.

Designated Target Box

The Designated Target Box is a rectangle on the HUD that is centered around the airplane currently selected as your target. The box appears when the target is within the live area of the HUD, which is roughly a rectangular area inside the HUD tapes. If the target's relative position shifts so that it is no longer within the live area of the HUD, the box disappears, but the Diamond-X points to the target if lock is retained.

In the training mission against the Lear jet, once the jet is selected as a target and the AIM-9J is activated, a target box pops up on the HUD, marking the location of the jet in the sky.

The Designated Target Box appears on the HUD even when the target is so far away that it can't be seen. In this case the box serves as a visual reference point for the target's location. As the target gets closer, a dark dot appears in the box, and then the aircraft begins to take shape and come into view.

Remember, when a target is so far away that it cannot be seen, you can get a close look at it from the External Camera. Once a target is selected, press the **[F6]** key twice to get the external view of the aircraft. This view can be zoomed and rotated.

The Designated Target Box stays with the selected target. When the target goes off the HUD, the target box goes away also, even if other enemy aircraft appear on the HUD in the interim. The target box stays on a target that has been shot down until either the airplane crashes or you change targets (by pressing the **[T]** key or **[Shift] - [T]** keys).

When the target leaves the live area of the HUD, the Designated Target Box is replaced on the HUD by the Diamond-X symbol (discussed next).

Diamond-X Symbol

The Diamond-X symbol that appears on the HUD does two things. First, it tells you that your radar still has a lock on the

target. Second, the location of the Diamond-X on the edge of the HUD's live area indicates where the target is.

The Diamond-X is an important tool for maintaining "situational awareness" and one of the key HUD features for air-to-air combat. Both to defend yourself and get in position to shoot down the enemy you need to keep aware of your enemy's location. Chasing the Diamond-X is one way of doing that.

Reading the Diamond-X

The position of the Diamond-X on the HUD indicates the turn you need to make to point your F-16 at the designated target as quickly as possible. For example, if the target is at your current altitude but off your right wing, the Diamond-X is halfway up the HUD and on its right side. Figure 8-2 shows a HUD with the Diamond-X in this position. Note the glint of light to the right of the HUD marking the actual location of the target, still visible through the windscreen.

The position of the Diamond-X halfway up the HUD indicates the target is at the same altitude as your F-16. The position of the Diamond-X to the right indicates that turning to the right is the quickest way to get the target back in view through the HUD. If the Diamond-X were centered at the bottom of the HUD, this would indicate that you needed to pitch down or dive. The Diamond-X to the top left of the HUD indicates you need to pitch up or climb, and turn to the left. The continued presence of the Diamond-X tells you that radar lock is being maintained.



Figure 8-2
Diamond-X symbol
on the HUD

In the Lear jet training mission, turn away slightly from the jet and watch as the Designated Target Box leaves the live area of the HUD and is replaced by the Diamond-X. If you turn only slightly, the jet may still be visible as a dot through an edge of the windscreen, as it is Figure 8-2.

Under normal conditions, the Diamond-X can be present only if the target is in front of the F-16. When the target is in front of you, missile and radar lock can be maintained. If the target gets behind you, both are lost. However, if you turn on the game options 360 Degree Radar and 360 Degree Lock, as explained in Chapter 6, the Diamond-X continues to report target direction, even when it gets behind you. In this case missile lock can be maintained, with two exceptions: missile lock can be lost by the AIM-9J if it doesn't have a sufficiently hot heat signature, and it can be lost by any missile if the target gets out of range.

The AIM-9J Sidewinder is an exception to this rule. It must face the rear of a target to acquire and maintain missile lock.

Chasing the Diamond-X

The direct maneuver to bring the target back into view through the HUD is called chasing the Diamond-X. In this maneuver you follow the direction signals of the Diamond-X symbol and turn directly for the target.

To see this in the Lear jet training mission, turn away from the jet and dive. Now roll the F-16 so that the Diamond-X is at the top of the HUD and centered. Then, when you pull back on the stick, you are pulling yourself around to bring the Lear back into view to your front. Figure 8-3 shows an F-16 rolled to the right, with the stick pulled back, turning to the right toward the target.

As an enemy aircraft maneuvers, use the stick to change roll as needed to keep the Diamond-X at the top of the HUD. Eventually, the superior turning ability of the F-16 should prevail and bring the target into view. The Diamond-X in this case guides you through the necessary tight turns, climbs, and dives.

Remember that when you are chasing the Diamond-X, the laws of gravity still apply. The effects of gravity and stalls can break up the chase. Also, remember that the ground is still below you—don't chase the Diamond-X right into a crash.

The effects of gravity (*G Effects*) and Stalls are game options that may be turned off. (See Chapter 6).



Figure 8-3

Chasing the Diamond-X in a hard right turn

SRM Diamond

When you first switch to the SRM Weapon mode, a small diamond appears, zig-zagging up and down the HUD. This diamond represents the heat seeker in the warhead of the missile just activated. By activating the missile, you have also activated the guidance system in the missile warhead, and the diamond represents the search by the guidance system for a suitable target. When the missile detects a target, it locks on. The SRM diamond then stops roaming across the HUD and centers itself on the target. When the missile has locked on to a target, the SRM diamond begins blinking.

To see this again in the Lear jet training mission, restart the mission (press the following keys and buttons, in order: **[Alt]** - **[O]**, Exit Game, Restart). When you press the **[W]** key once to activate the AIM-9J, you can see the SRM diamond zig-zag across the HUD. Press the **[T]** key to select the Lear as a target, and watch as the diamond eventually picks up the Lear and floats onto the Designated Target Box.

The infrared guidance systems of the AIM-9J and AIM-9M Sidewinder missiles search for a source of intense heat when activated. This search is represented by the roaming of the SRM diamond on the HUD. The most common source of heat found is the engine exhaust from the rear of a target. The AIM-9M contains a more sophisticated heat seeker and can pick up heat signatures from all aspects of an aircraft, not just the engine. Other heat sources can be air friction over the fronts of the wings, or the engine inside the plane.

Once the SRM diamond has locked onto the target, it is ready to fire. Maintain the missile lock, close to firing range, and shoot when you have a good shooting position. When the target is within firing range, the In Range message appears on the HUD. (This message is discussed next).

If you are playing with the optional sound effects on, there is an audio clue associated with the SRM diamond. A tone is heard when the SRM diamond is searching. When the missile is within range and locked on, the tone goes flat. Use the sound cue to reinforce the data the HUD is presenting. Some pilots follow the sound cue alone, ignoring the HUD symbols and concentrating on other concerns.

Remember that the SRM diamond appears only in Short Range Missile Weapon mode. It doesn't appear in Medium-Range Missile mode, when the AIM-120 is activated.

In-Range Message

The In-Range message is two words, IN RNG, that appear in the lower left of the HUD, as shown in Figure 8-4. This message appears when the target that the warhead is locked on to approaches within range of the missile. Assuming that the target doesn't move too far away in the time it takes the missile to close, the message indicates that the missile can reach the target at this distance. Remember, the In-Range message appears only when the HUD is in the close zoom (press the **F1** key to bring it close). The message does not appear in the far-zoom HUD.



Figure 8-4

Range readouts on the HUD in close zoom

To see this in the Lear jet training mission, head directly for the jet, increasing speed if you have to. As you get closer, watch the In Range message pop up on the left side of the HUD.

The In-Range message appears for both the Sidewinder and AMRAAM missiles. Table 8-1 shows the approximate range at which the message appears for the three different air-to-air missiles. As you can see, the oldest missile, the AIM-9J has the shortest effective range. The most modern missile, the AMRAAM, has the longest range by far, suggesting different tactics for its use. In an emergency, these missiles can be fired at targets before the In Range message appears. The effective range shows when they have the best chance of scoring a hit, versus the maximum range that they might be able to reach.

To check the current range between your F-16 and the selected target, refer to the Range-to-Target readout on the HUD.

Range-to-Target Readout

The Range-to-Target readout continually reports the distance between your F-16 and the selected target, in nautical miles. It can be found at the bottom right of both Short- and Medium-Range Missile Weapon mode HUDs. The Range-to-Target readout can be seen in Figure 8-4. It consists of the letter R followed by the number of nautical miles between the two aircraft. In Figure 8-4 the range between the F-16 and its target is 2.06 nautical miles.

The Range-to-Target readout is in constant flux because the two aircraft are in continual motion, almost always closing or pulling apart. The Range-to-Target readout rarely holds steady. If you can close the range between yourself and the target, the readout shows the range decreasing. If you can get close enough, the readout eventually drops past the distance at which the missile is effective, and the In Range message pops up on the HUD.

You can watch the Range-to-Target readout fall in the Lear jet training mission as you approach the jet from the rear.

Use the Range to Target readout to help plan air attacks. Keep track of the range to determine when to start air maneuvers, such as the early turn (discussed in Chapter 14). Judge from the range at what point to consider launching an AIM-120 AMRAAM, if that is a possibility. If you are under missile attack, the Range-to-Target readout may indicate that you are far enough apart that temporarily turning away and running is a viable evasion tactic.

To determine quickly whether the Range-to-Target gap is increasing or widening, check the Closure Rate readout, found on the HUD.

Table 8-1 Effective Air-to-Air Missile Ranges

Missile	Effective Range	Maximum Range
AIM-9J Sidewinder	<2.65 nautical miles	6 nautical miles
AIM-9M Sidewinder	<4.30 nautical miles	10 nautical miles
AIM-120 AMRAAM	<24.70 nautical miles	40 nautical miles

Closure Rate Readout

The Closure Rate readout continually reports the rate at which your F-16 and your target are either closing or pulling apart. It can be found at the bottom right of both SRM and MRM Weapon mode HUDs, as seen in Figure 8-4. It consists of the letter C followed by a number.

The number may be positive (no sign) or negative (preceded by a - sign). A positive number is the rate in knots at which you are coming together, and a negative number is the rate in knots at which you are pulling apart. In Figure 8-4 the Closure Rate between the F-16 and its target is 108 knots. The two planes in this example are coming together at that speed.

When two planes are flying toward each other, the Closure Rate is positive and normally quite high. When they are flying away from each other, the rate is negative and can be quite high again. When you are chasing or being chased, Closure Rates are much smaller.

Remember from the discussion about airspeed in Chapter 2 that 1 knot equals one nautical mile per hour. If you are closing fast, the window of opportunity for firing a missile may exist for only a few moments.

The Closure Rate is also changing constantly, especially when the two aircraft are maneuvering in combat. The important facts about it to remember are that a positive number means you are closing and a negative number means you are pulling apart. There are times during combat when you may want to know quickly whether the enemy is closing or pulling away, and this is where you can look to find out.

Target Aspect Angle Circle and Caret

The Target Aspect Circle and Caret combine together into one HUD symbol to report the relative aspect of the target aircraft (that is, the position of the target relative to you). Once you understand how to read these symbols, they can be very useful indicators

in combat. They can be read in conjunction with the aspect angle information found on the Single-Target Tracking Radar MFD(multifunction display), or alone.

The Target Aspect Angle Circle and Caret appear on the HUD in both SRM and MRM Weapon mode.

Reading the Target Aspect Angle Circle

The circle is fixed on the HUD and doesn't move, while the caret rotates around the circle. The position of the caret is a visual representation of the angle between the target's tail and the F-16's nose. Table 8-2 shows eight different sample caret positions and the aspect information you can determine from them.

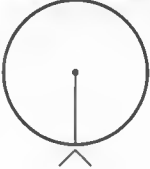

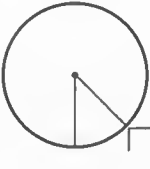

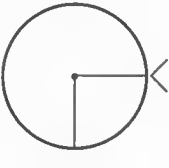

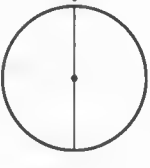

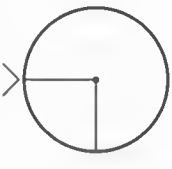



When looking at Table 8-2, understand that the position of the caret is the same whether you are flying toward or away from the target. For example, if the caret is at the bottom of the circle, this indicates that the rear of the target is closest to you. But this is true both when you are flying directly at the target or directly away.



You can see this in the Lear jet training mission with the AIM-9J activated. As you come up on the jet from behind, notice that the caret stays near the bottom of the Target Aspect Angle Circle, indicating that the rear of the target is closest to you. Fly past the Lear jet without shooting and see that the caret rotates around to the top of the circle, indicating that now the front of the bomber is closest to you.

Fly past the Lear jet until the Range-to-Target readout is 4 or 5 nautical miles, and then do an Immelman turn, as described in Chapter 3. Now you should be headed back toward the jet head on. The caret remains at the top of the circle, even though you just made a 180 degree turn. The caret at the top indicates of the circle that the nose of the enemy plane is closest to you, as you would expect, flying toward it head on.

Hold your heading directly for the Lear jet and fly past it again. Watch as the caret rotates down to the bottom of the circle, indicating that the closest part of the target is once again its rear. The caret has occupied the same position on the circle in two entirely different circumstances: once when you were chasing the Lear jet and once when the two aircraft were flying directly away from each other.

Table 8-2 Sample Target Aspect Angle Circle and Caret Positions

Caret Position on Target Aspect Circle	Aspect Angle	F-16/Target Relationship
	0 degrees	
	45 degrees	
	90 degrees	
	180 degrees	
	90 degrees	
	45 degrees	

 F-16
  Target

Using the Target Aspect Angle Circle

Once past any confusion regarding what the Target Aspect Angle Circle is reporting, it can be a useful tool. Your best chance of scoring a hit with an AIM-9J is to fire it at the target's rear, because the heat from the engine exhaust is easy for the missile guidance system to follow. The Target Aspect Angle Circle can help you choose a good time to fire by indicating two things about the target.

First, the circle and caret indicate when you are behind the target. When the caret is on the bottom half of the circle, the rear of the target is closest to you. If you can see it through the HUD at the same time, you must be facing its rear.

Second, how close the caret is to the bottom of the circle indicates how narrow the target aspect angle is. The more narrow the aspect angle, or the closer the caret is to the bottom of the circle, the better the chance of a missile hit. This is because a narrow aspect angle indicates three things: that more of the target is beyond the heat source and likely to be hit, that the heat source signature is more intense and easier to read, and that the target cannot turn very far in trying to get away.

Conversely, the wider the aspect angle (the angle between the bottom of the circle and the caret; see Table 8-2), the greater the difficulty of scoring a hit. This is true for three reasons. First, less of the target is beyond the heat source and a missile headed for the engine is more likely to miss the plane. Second, as the angle widens, the heat is not as strong and therefore less easy for the missile to keep locked on. And third, the wider the angle (the closer it is to 90 degrees), the faster the target is moving across your path, left to right or right to left. The faster the target moves across your path, the sharper the turn that will be required from the launched missile to stay locked on.

To see this, practice shooting at the Lear jet in the training mission. Shoot at it from a narrow aspect angle, directly toward the rear, and then swing out and back to come at it more from the side. You may see many of the side shots miss. This is more likely against a fighter aircraft which maneuvers more violently.

You may find that the aspect circle is more useful when the Single-Target Tracking Radar MFD is turned on, because the Target Aspect Angle readout on that display complements the information shown on the circle. This display is discussed earlier in Chapter 5.

The Single-Target Tracking Radar display indicates the aspect angle in degrees, from 0 to 180. When the angle is below 90,

you are facing more to the rear of the enemy plane. Over 90, you are facing the front of the plane. As the aspect angle approaches 0, you are lining up more directly behind the target. The smaller the angle, the lower the caret on the circle, and the better the chance of a hit.

The Target Aspect Angle Circle and Caret symbol is one of the more difficult HUD features to understand. Many new *Strike Commander* pilots ignore it. However, it can be very useful in determining when to shoot, increasing accuracy and cutting down on expensive misses.

Missile Lock

Missile lock is the electronic recognition of a target by the guidance system of a missile's warhead. When a missile is activated, the guidance system is turned on, and electronically told to find its target and get ready for launch. The guidance system searches the sky and locks on when the target is found. The missile maintains the lock until unable to do so.

Scoring a hit with an air-to-air missile depends on three things related to missile lock. First, your missile must find the target and lock on to it. Next, the missile must maintain the lock until a firing position has been reached that has a high probability of scoring a hit. Finally, the missile must maintain lock after launching. These factors apply to both heat-seeking missiles and radar missiles.

The best firing position for a missile differs for each of the three missiles available to Wildcat pilots, as discussed below.

Achieving Missile Lock

Sidewinders and AMRAAMs achieve missile lock in different ways. The HUD displays for the two missile types are also different. The first step in achieving missile lock, regardless of type, is to activate the missile by pressing the **[W]** key until the weapon you want is ready. (Activating weapons is discussed further in Chapter 7).

Sidewinder Missile Lock

To obtain missile lock with a Sidewinder, first select the target. Do this by pressing the **[T]** key once the potential target is in front of your F-16. If you have the Auto-Targeting option on, a target is selected automatically when it comes within radar range. In this case you don't have to press the **[T]** key. Selecting targets is discussed further in Chapter 7.

Once a target is selected, activate the Sidewinder missile by pressing the **[W]** key (missile activation is also discussed in Chapter 7). As soon as the missile is activated, it begins searching for the selected target. Look for the SRM diamond, roaming across the HUD. This represents the search of the missile's warhead. If the missile was already active when the target was selected, the missile begins its search automatically.

If the target is in front of your F-16, an AIM-9M should lock onto the target quickly. The AIM-9J will also lock on quickly, but only if the rear of the target is closest to the missile.

The SRM diamond floats over to the Designated Target Box and centers itself on the target's HUD position, inside the box. Once the SRM diamond has centered on the target it begins to blink on and off. This blinking indicates that the missile has locked on.

There are also sound effect cues during missile lock that you can listen for. While the missile searches a tone is audible. This tone increases in pitch once lock is achieved.

Once missile lock is achieved, the missile is aware of its target and ready to fly toward it.

AIM-120 AMRAAM Missile Lock

The AIM-120 AMRAAM missile searches for and locates its target automatically, under two conditions: the missile must be activated and a target must be selected. Press the **[W]** key, several times if necessary, until the missile is activated (see Chapter 7 for more information about activating weapons). Press the **[T]** key to select the nearest target to the front of the F-16 (refer to Chapter 7 for more information about selecting targets). Regardless of whether you activate the missile first or select the target first, once these two steps are taken the missile automatically locks onto the target.

There is no equivalent to the SRM diamond for the AMRAAM missile. If the Designated Target Box appears on the HUD, then the missile is locked on. The Designated Target Box indicates that the target is selected. Check this by opening your air-to-air radar. The blip on the radar screen in brackets is the currently selected target, marked on the HUD by the Designated Target Box. This is also the target that the missile is locked on.

The HUD in Figure 8-5 indicates that an AMRAAM missile is activated and that a target has been locked on. You know this because the missile is activated and the Designated Target Box is on the HUD. This missile is ready to fire and knows where to go.

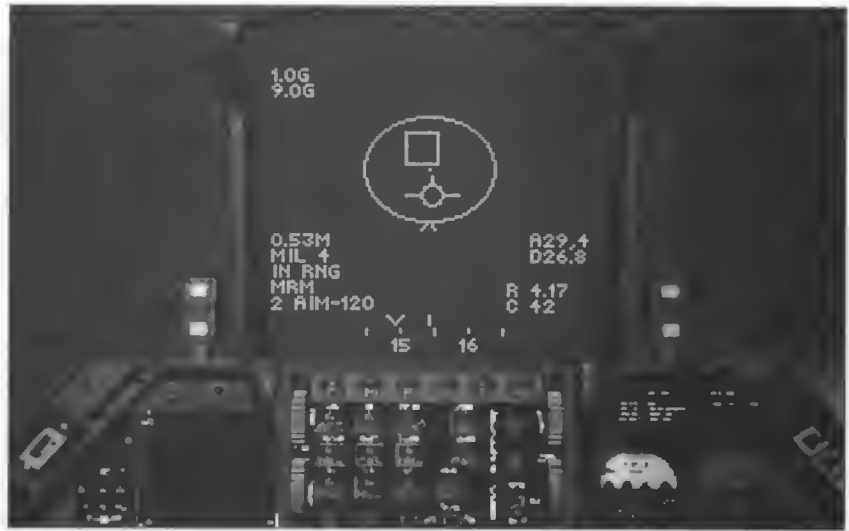


Figure 8-5

HUD showing an AMRAAM missile locked on

The AMRAAM can lock onto a target long before it can be seen through the HUD. The ability to lock onto targets far beyond visibility and beyond range of the Sidewinder missiles makes the AMRAAM a very useful weapon. Targets can be shot down before they pose any threat.

Maintaining Missile Lock

To maintain an existing missile lock, keep the target in front of the F-16, preferably within the live area of the HUD. If the target's position cannot be kept within the HUD, the Diamond-X symbol indicates the way to turn to get him back into view. If the target gets behind your F-16, the missile lock is lost and the Diamond-X symbol disappears, unless you have turned on the game option 360 Degree Lock (see Chapter 6).

If missile lock is lost, get the target back in front of the F-16 again and press the **[T]** key to reselect it as a target. If you have the game option Auto-Targeting on, just getting the target back in front of the F-16 is enough to reselect it, unless there are multiple targets available. In this case the Auto-Targeting option has selected the nearest target, possibly one you prefer not to shoot at immediately. Press the **[T]** key to cycle through possible targets to select the one you want.

Maintain the missile lock until the position of the target offers a good chance of scoring a hit. The best positions from which to shoot the different air-to-air missiles are discussed next.

Air-to-Air Missile Tactics

The three kinds of air-to-air missile that the Wildcats use have different abilities and require different tactics to be effective. Despite these differences, there are some general tactics and practices common to all three, as described below

On occasion, desperate (and sometimes foolhardy) Wildcats use rockets in air attacks. Rockets are poor air-to-air weapons but can be used in an emergency. We'll discuss them briefly at the end of this section.

General Missile Tactics

To hit a target, all three missile types must be locked on to the target before being fired, as described earlier in this chapter.

All three missiles have proximity fuses that explode the warhead when close to a target. This means that the missile only has to get close to cause damage. Unfortunately, proximity explosions may not cripple or destroy the target. The AIM-9J has the smallest proximity radius and must be the closest to a target to explode. This compensates for its smaller warhead. The AIM-120 has the largest proximity radius.

When engaging in missile combat, make the HUD as easy to read as you can. Zoom in the HUD by pressing the **F1** key, and turn off the optional tapes and Pitch Ladder. (See Chapter 6 for how to do this). This reduces the information shown on the HUD, allowing you to concentrate on a few important readouts. Keep your eye on the Target Aspect Angle Circle to watch for a good shooting angle, and wait for the In Range message to let you know that you are within range to fire.

Attempt to lead your target with a missile shot by having your F-16 pointed slightly in front of the target. This makes it harder for the target to turn away from the missile. Leading the target also keeps your missile's guidance system a little further away from chaff or flares the target might drop as a decoy.

When firing missiles at a target head on, the range should be 2.0 nautical miles or more. The faster the rate of closure, the farther out a missile should be fired. If a missile is fired head on at less than 2.0 nautical miles, the chance of a hit drops fast, because the target position changes too fast for the missile to react. If you must shoot at extremely close range, lead the target slightly to improve your chance of a hit.

Be prepared for missiles to miss. Even when you have lined up a good shot, something can go wrong or the enemy pilot may be able to evade. Proximity explosions may not cause crippling damage. Better enemy pilots are more likely to avoid your missiles,

as are more maneuverable aircraft. Some aircraft you face are especially designed to reduce their infrared and radar signature, making it difficult to maintain a missile lock against them.

Once launched, a missile does its best to maintain a lock on its intended target. But missiles can get confused. As you try to maintain situational awareness, have some idea of where your wingman is. A confused missile can pick up a friend as well as an enemy. Try to shoot in a direction where no aircraft other than the target are located, unless you know that no friendly aircraft can be out there.

Don't forget that there are some camera views that can help you find targets that go out of sight in a missile fight. The Auto-Tracking Target camera ([Y] key) and the Player-to-Target camera are both useful for finding the enemy. (Both of these cameras are discussed in Chapter 4). In a close fight don't stay in a camera view too long. Get back to the HUD so you can watch the Target Aspect Angle Circle and determine when best to fire.



Against any multiengine aircraft, one missile hit may not be enough to bring it down. Be prepared to hit these aircraft more than once. However, an aircraft that has taken a hit is vulnerable in a dogfight and should be dispatched with gunfire if you can afford the air time. This saves expensive missiles for undamaged opponents.

AIM-9J Sidewinder Tactics

To score hits with the AIM-9J, keep in mind two factors. The missile has a relatively short range and its infrared guidance requires a strong heat source to follow. The primary criterion for scoring an AIM-9J hit is obtaining a narrow target aspect angle at the moment of firing.

AIM-9J Range

The In Range message appears on the HUD for the AIM-9J when the target is within 2.6 nautical miles or less. To improve the odds of scoring, the range should be a little below the maximum.

One benefit of having to fire from such short range is that the missile covers the distance to the target quickly, allowing only a short time for evasive maneuvers. If the target doesn't respond immediately, the probability of a hit is good. However, even short range doesn't help if you don't shoot from a good angle.

Shooting the AIM-9J

Shoot the AIM-9J at the rear of the target, when the Target aspect angle is 30 degrees or less, and at a range of 2 nautical miles or

less. Wait for the caret to be near the bottom of the Target Aspect Angle Circle. If the caret is more than one-quarter of the way toward the top of the circle, hold your fire and wait for a better shot.

It is very difficult for the AIM-9J to lock onto a target from anything but a rear aspect, but if it does, don't shoot unless you're really desperate. It has little chance of maintaining the lock and hitting.



Don't fire an AIM-9J if the sun is within sight behind your target. The AIM-9J's heat seeker is not sophisticated enough to distinguish between the sun and your target, and may lock on the sun instead.

Figure 8-6 shows a good shooting position for an AIM-9J. The caret is near the bottom of the Target Aspect Angle Circle, indicating a narrow aspect angle, and the range is less than the missile's maximum. Expect to hit much more often than miss with shots like this one.

AIM-9M Sidewinder Tactics

The tactics for using the AIM-9M are similar to those for the AIM-9J, with two important differences. The AIM-9M missile has roughly twice the range and it has an all-aspect lock-on capability. The effects of these differences are that the AIM-9M can hit from a longer range, with a wider target aspect angle, and



Figure 8-6
Good shooting
position for an
AIM-9J

from the front as well as the rear of the target. The AIM-9M is sophisticated enough that it is not decoyed by the sun.

AIM-9M Range

The In Range message appears on the HUD for the AIM-9M when the target is within 4.3 nautical miles or less. This longer range does allow the target more opportunity for maneuver and evasion. However, the AIM-9M compensates for this partially by flying faster than the AIM-9J.

Shooting the AIM-9M

Shoot the AIM-9M at either the front of the target, when the target aspect angle is 135 degrees or less, or the rear of the target, when the angle is 45 degrees or less. Range to target should be 4 nautical miles or less. Wait for the caret to be near either the bottom or the top of the Target Aspect Angle Circle. If the caret is along the middle one-third of the circle on either side, hold your fire and wait for a better shot.

Another consideration before firing is the vector of the target. If the enemy is in a high-*G* turn, you may have a zero aspect angle and still miss. The tighter the target appears to be turning, the closer you should be to shoot. If the target is flying relatively stable, a longer shot can score.

Figure 8-7 shows a good AIM-9M shooting position at the front of a target. The caret is near the top of the Target Aspect

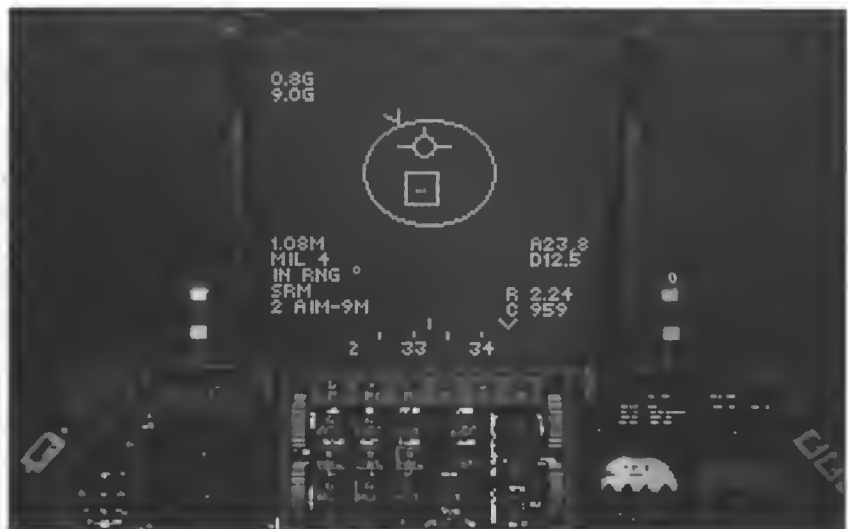


Figure 8-7
Good head-on
shooting position for
an AIM-9M

Angle Circle, indicating a narrow aspect angle, and the range is less than the missile's maximum. This shot has a high probability of scoring a hit.

AIM-120 AMRAAM Tactics

The tactics for using the AIM-120 can be quite different from those for the heat-seeking missiles, because the AMRAAM is a radar-guided, medium-range missile. The AIM-120 missile has a range roughly six times that of the AIM-9M. Its radar guidance system gives it an all-aspect lock-on capability.

The AIM-120 has the advantage of being a standoff, fire-and-forget weapon, which can be launched long before the enemy is visible. The missile can be launched and then you can turn away before the target poses any threat.

If necessary, the AIM-120 can be used at much closer ranges, in a manner similar to the Sidewinders. However, this is a wasteful use of the missile in a capacity for which the much cheaper Sidewinders or Vulcan cannon are more suitable.

AIM-120 Range

The In Range message appears on the HUD for the AIM-120 when the target is within 24.7 nautical miles or less. This is quite beyond what you can see, but well within the maximum range of your air-to-air radar.

When the AIM-120 is fired at near maximum range, the target has a substantial amount of time to take evasive action or run away.

Shooting the AIM-120

Shoot the AIM-120 at a range of 18 nautical miles or less. The target aspect angle is not a concern unless the target is within 4 nautical miles. In this case, the AIM-120 is not the preferred weapon against the target. At the medium ranges that the AIM-120 can hit, the target has time to change its heading as it wishes, and the missile must keep up with its turns. This makes the aspect angle at the moment of firing meaningless. When the target is within 18 nautical miles, it cannot turn as easily and run away.

If you must shoot the AIM-120 at closer ranges, lead the target to make the missile that much harder to evade and less susceptible to being decoyed by chaff.

Shooting Rockets in Air-to-Air Combat

The 3 inch rockets that the F-16 carries can be used in air-to-air combat, although the chance of scoring a hit is very small.

Rockets are difficult to use against aircraft for three reasons. First, they are nonguided weapons that cannot be controlled once fired. Second, the HUD has a limited capability for aiming them against air targets. Third, unlike Sidewinders and the AIM-120 AMRAAM, rockets do not have a proximity fuse and must actually hit the target to explode.

In their favor for air combat, rockets are cheap, they are often plentiful, they are fired in salvos (giving multiple chances for a hit), and they are powerful enough that a hit almost guarantees shooting down the target.

When you are using rockets in air-to-air combat, turn off the optional Weapon Camera. This allows you to fire rockets again quickly if the first salvo is clearly going to miss the target.

Rocket Range

The effective range for rockets is approximately 1.5 nautical miles. Beyond that range, they begin flying erratically. Within that range they fly nearly straight, in the direction the F-16 is pointing.

Shooting Rockets in Air-to-Air Combat

Once rockets are activated, they can be fired by pressing the Fire button 1 on the joystick or the spacebar. They are activated only in Strafing Weapon mode (STRF). In this mode the Strafe Reticle appears on the HUD. This is a small circle with a dot in the center. When the rockets are fired, they fly straight for approximately 1.5 nautical miles in the direction indicated by the reticle at the moment they were fired.

The difficulty is that air targets are moving and placing the Strafe Reticle on a moving target almost guarantees a miss. By the time the rockets get there, the target has moved. To hit air targets with rockets, you must lead the target enough so that it flies into the path of the missiles. The amount of lead required depends on the range to the target and his speed. Guess the lead required as best you can, and keep trying. Hitting with rockets is not impossible, but it is difficult, to the point that scoring a hit is mostly a matter of luck.

To increase your chances, attack from the bottom or top of the target. This presents the widest surface area of the target to the oncoming rockets, offering the best chance of interception.

For a sample of the difficulties of scoring with rockets, set up a dogfight training mission against five TU-95 bombers and take along a few pods of rockets. The TU-95s fly straight and level, at least for a while, and are as fat a rocket target as you will ever see. Shoot along the row of bombers from the side to increase the chance of scoring a hit. Shooting from above and below offers the best chance of hitting a specific bomber.

If you master using rockets against bombers, try them in a dogfight against a real fighter.

Evading Missile Attacks

The corollary to attacking aircraft with missiles is evading missiles fired at you. As a Wildcat pilot, you will encounter all three of the different missiles that you can carry, plus surface-to-air missiles (SAMs) fired from ships and launchers below. Being hit with a missile is usually the end of your Wildcat career and something to be avoided.

Always keep an eye on the Missile Warning Lights on the top left of your instrument panel. They provide the first warning that a missile is after you, and helpfully report what type it is, heat seeker or radar guided. In a potential air-to-air situation, never have open two MFDs, because the second one on the left side obscures the Missile Warning Lights.

The keys to missile evasion are maneuver and deception. Maneuver in such a manner that the missile cannot keep up with you. Use deception to confuse the missile and break its lock on your F-16. How best to maneuver and deceive depends on the type of missile that is tracking you.

Remember that decoys and maneuvers are most effective when the missile is close. The decoy is more powerful and the missile has less opportunity to turn quickly once past the decoy. If you have turned sharply beyond the decoy, the missile may be unable to get back on your tail. But don't let the missile get too close, either—you need time to turn away. If the missile is too close, it can reacquire missile lock once past the decoy and turn with you.

Maneuvers alone may be enough to shake a missile. When you are being tracked, attempt to make a sharper turn than it can make. This is called turning inside the missile. If the missile can't keep up with your turn, it eventually flies past you, no longer a threat. Watch the Missile Warning Light as you turn. It blinks more quickly as the missile gets closer and stays locked-on. If the missile stays with you, keep turning but drop a decoy.

Remember that you carry only a limited number of decoys. Check the Weapons MFD by pressing the [W] key to see how many decoys you have remaining. Once they are gone consider turning for home, because your chances of surviving more missile attacks are slim.

Evading Heat-Seeking Missiles

To evade a heat-seeking missile, drop a flare by pressing the [] key and then make a sharp turn at a right angle to your previous heading. The flare is very hot and intended to confuse the heat-seeking missile into transferring its missile lock onto it and off of your F-16.

If you have the afterburner on, reduce to Throttle Setting 4 or 5 after dropping the flare to reduce your heat signature.

If you are engaging an older aircraft, you may be facing an AIM-9J missile. In this case you may be able to shake the missile by climbing toward the sun, and then making a sharp, diving turn away. The AIM-9J has a good chance of being decoyed into heading for the Sun. Watch the Missile Warning Lights to see if the missile loses you.

If you are being tracked from the front by a heat seeker, it is an AIM-9M. Turn away from the missile. Once headed away, drop a flare and continue turning.

If, instead, you drop a flare and continue heading for the missile, it will probably miss the flare and stay locked onto you. By turning away and then dropping the flare, you give the missile every chance to be decoyed.

Evading Radar Missiles

Radar missiles are also best evaded by sharp turns and chaff decoys. Try the turn first and watch the warning lights to see if the missile is still headed for you. Continue to turn and drop chaff by pressing the [] key if the turn doesn't shake the missile. Chaff is a bundle of radar reflective metal strips that produce a large radar signature. Chaff is intended to confuse the radar guidance of the missile into locking onto it instead of you. Once the missile flies through the chaff, the missile may be unable to reacquire your F-16 or may not be able to turn and catch you.

Avoid a head-on radar missile in the same manner as discussed above for a head-on heat seeker. If the range is long enough, you may be able to turn away and outrun a radar missile.

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DOGFIGHTS: AIR-TO-AIR GUN COMBAT



The advent of missiles was thought at first to make guns obsolete on fighter aircraft. During the Vietnam War, pilots soon discovered that guns were still very handy and most postwar fighter aircraft were still equipped with them.

As mentioned in Chapter 8, every *Strike Commander* mission involves air-to-air combat at some point. Missiles are the weapon of choice in air battles because they are quick and effective. Unfortunately for the Wildcat squadron, they are also costly and only so many can be carried on each mission. There are *Strike Commander* missions where you could use many more missiles than you can carry. The cheap alternative to missiles in air combat is the Vulcan cannon.

A Wildcat pilot who is proficient with the Vulcan cannon in a dogfight helps the squadron in two ways. First, a good gun fighter is more likely to survive and complete a mission. Second, gun ammunition is essentially free and preferable to costly air-to-air missiles. Using the Vulcan is the only choice when you run out of missiles and the financially smart choice when facing second-quality opposition. Every missile you save is one that might be useful later against ace enemy pilots.

To use the Vulcan gun successfully in air combat, you need to understand both how the gun works and how to aim it, which involves several steps. You must maneuver the F-16 into a shooting position, and then use heads-up display (HUD) features to predict where the shots are going to go. And then you must predict where

the target aircraft is going to be in a second or two and adjust everything so that a stream of shells can intercept him.

In this chapter, we review how the Vulcan cannon works followed by a discussion of some special HUD features that help you use the cannon in a dogfight. Mostly we'll talk about how to aim the cannon and what tactics can be used in *Strike Commander* to achieve a good shooting position. (Note that what works in the game may not be practical or advisable for real pilots.)

The Vulcan Cannon

The Vulcan cannon is a six-barreled Gatling gun that fires 20mm cannon shells. The six barrels are necessary because individual barrels fire too slowly. The speed of modern aircraft is such that a target could literally fly through a stream of single-barrel gun shells without being hit. The multibarrels prevent this from occurring and guarantee some hits if a target passes through the stream of shells.

The effectiveness of the shells depends greatly on how fast they are traveling at the moment they hit the target. Shell velocity depends on how far the shell has traveled before hitting.

Firing the Vulcan Cannon

To fire the Vulcan cannon at air targets, first activate it for air-to-air combat in the Dogfight mode by pressing the [W] key. Once activated, fire it by pressing Fire button 1 on the joystick or the spacebar. If you press and hold down the button or spacebar, the gun continues to fire until its ammunition runs out.

It's good gun practice to keep your firing burst short. Get in the habit of waiting for the right moment, pressing the button (or spacebar), and then immediately releasing it. This keeps ammunition expenditure down. At the same time, choosing the right moment should keep the number of hits high.

Avoid hosing the sky with long streams of cannon shells unless you have the Unlimited Ammo option turned on. During a long stream of shells the actual period when hits are scored is generally quite small. Most of the shells are misses. Hosing is a little more practical when you have a very narrow aspect angle, either tail on or head on. In these cases, it is hard to see when the reticle is actually on target, as positions change rapidly. A long stream of shots does offer the possibility of scoring some hits.

Every fifth round fired from the cannon is a tracer that burns during flight. Tracer rounds make it possible for you to follow the trajectory of the shells by watching them through the windscreen.

Cannon Range

The cannon and its HUD sight are bore-sighted to a range of slightly over 2,000 feet.

The maximum range that a cannon shell can reach is 6,000 feet, but the effective range is much less. Once the shell goes past roughly 3,000 feet, or 0.5 nautical mile, it decreases in velocity and starts to descend because the pull of gravity begins to overwhelm the thrust the shell received when fired. To compensate somewhat for the gravitational pull, the gun is actually mounted in a slight cant up from the horizontal plane of the F-16. Shells leave the cannon pointing up slightly.

Cannon Hits

A cannon hit is scored when the program detects a collision between a cannon tracer round and the target aircraft.

When a cannon shell hits an aerial target, an orange explosion can be seen. Multiple explosions indicate multiple hits. Parts of the target aircraft may be blown off and smoke may begin to trail behind the plane. If the target is shot down, the pilot usually screams an appropriate message and the plane pitches down toward the ground. Figure 9-1 shows cannon hits being scored on an enemy aircraft. Note the debris falling back from the damaged aircraft.

If you turn on the game option Easy Gun Hits, the program relaxes the requirement for detecting a collision between rounds and aircraft, and hits are scored in cases that would otherwise be near misses.



Figure 9-1

Cannon hits on an aerial target

Cannon Damage

Cannon shells can do appreciable damage to an aerial target if they can hit it within their maximum effective range of 3,000 feet. They do even more damage around the bore-sighted range of 2,000 feet, and even more around 1,000 feet.

Each aircraft can absorb a limited amount of damage before being shot down. When shells hit they cause damage. As more shells hit, the damage accumulates until first the aircraft is crippled and then shot down. Crippled aircraft begin trailing smoke, but remain aerodynamic and keep flying. Shot-down aircraft go out of control and head for the ground.

The program calculates damage by counting the number of tracer rounds that intercept an aerial target. For each tracer that hits, the damage is determined from the range and then multiplied by five. The multiplication represents the additional damage caused by the four normal shells loaded between each tracer. The program is really only keeping track of the tracer rounds and then adding the nontracer rounds into its calculation.

A few hits at close range may be enough to shoot down an aircraft, while it may take many more hits at the further limits of the gun's effective range.

Cannon Ammunition Limits

Before every mission, the Vulcan cannon is automatically loaded with 1,000 rounds. As the gun is fired, the rounds are expended. The number of rounds left is marked on the HUD under the Weapon mode and can also be read off of the Weapons multi-function display (MFD), as discussed in Chapter 5.

If you turn on the option Unlimited Ammo, the cannon never runs out of shells. This is true in both game and training missions. The Weapons Remaining readout on the HUD continues to report 999 rounds left. This game option is discussed in Chapter 6.

The Dogfight HUD

When the Vulcan cannon is activated in Dogfight Weapon mode for air-to-air combat, a new feature appears on the HUD, called the Gun Sight Reticle. This cannon sight helps determine when to shoot. In addition, a number of previously discussed features are also present to help you achieve and maintain situational awareness.

If you have the opportunity to do so prior to a dogfight, set HUD options so that clutter is minimized. Zoom in the HUD so

symbols are larger and easier to read (press the **F1** key). Turn off the Pitch Ladder and possibly the optional tapes as well (see Chapter 6). If you are carrying air-to-ground weapons, switch to Air Combat Maneuver mode by pressing the **G** key (see Chapter 7). Figure 9-2 shows a HUD cleared off in preparation for a dogfight.

Gun Sight Reticle

The Gun Sight Reticle is a computer-controlled predictor gun sight that helps aim the F-16, and thus the Vulcan cannon. Without the aid of this sight, aiming the cannon would be very difficult, because of the high speed and maneuverability of modern aircraft.

The Gun Sight Reticle appears on the HUD as a circle with twelve tic marks around the outside. Inside the circle is a dot. The Gun Sight Reticle can be seen in Figure 9-2.

This sight greatly improves the probability of scoring hits against aerial targets, once you understand how it works and how to use it.

How the Gun Sight Reticle Works

The Gun Sight Reticle is placed on the HUD by the F-16's targeting computer and shows where shells will strike at a distance of roughly 2,000 feet if fired immediately. The onboard computer simultaneously considers radar data about the speed and vector of the target versus the speed and vector of your F-16, plus the



Figure 9-2
HUD clutter
reduced for a
dogfight

range to the target and the velocity of the shells at that range. (Remember that *vector* is the three-dimensional motion of the aircraft.)

When the Gun Sight Reticle is on the target, fire the cannon—at least some shells should hit. However, proper working of the predictor gun sight requires several conditions:

- The target must be selected (selecting targets is discussed in Chapter 7). A selected target has a Designated Target Box around it, as seen in Figure 9-2. If the aerial object you think you are shooting at does not have this box around it, the Gun Sight Reticle is not predicting where the shots will go relative to that plane. In this case a hit is very unlikely.
- The target must be within effective range of the gun. Check three places on the HUD to see if you are in range: the Range-to-Target readout, the In Range message, and the Gun Sight Reticle itself, as discussed below. If the target is not within range, scoring a hit is unlikely and would cause little damage anyway.
- The target cannot make a sudden maneuver unanticipated by the computer. If the target is able to do so, the prediction of the Gun Sight Reticle may be off and the shells may miss. This is a common cause of missed shots and, unfortunately, is out of your control.
- The motion of your F-16 must be stable for a second or two before firing. If you are pulling *G* forces, the computer adds the gravitational force into its calculation and consequently keeps moving the Gun Sight Reticle around the HUD. Under these conditions, scoring a hit is very difficult. By holding the F-16 stable for a second or two, the predictor gun sight can eliminate the extra *G* forces and keep the Gun Sight Reticle steady on the HUD.

Using the Gun Sight Reticle

The key to using the predictor gun sight successfully is understanding the distinction between positioning the gun sight so that the target flies under it versus chasing the target with it. If the gun sight is steady and the other preconditions listed above are met, hits are all but assured against a target that flies directly under the dot in the center of the gun sight. Conversely, chasing the target with the gun sight has almost no chance of a hit because the maneuvers necessary to aim the F-16 and gun sight normally require changes in *G* forces that destabilize the gun sight. It is

continually floating and cannot accurately predict where the shots will go. Chasing the target with the gun sight is a major cause of bad shooting by new pilots.

It is accurate to say that you don't lead the target with the gun sight to hit, as a skeet shooter does. If you fire when the gun sight is leading the target and not on it, those shots miss. However, the easiest way to get the target under the gun sight is to lead him slightly, steady the F-16, and wait for the target to center itself under the gun sight as it flies past. Then shoot. When the target is under, or within, a steady gun sight, shots do hit.

Always try to position the Gun Sight Reticle in front of your target, in the middle of the path you expect him to take. If you can get the gun sight steady in his path, you should have a great shot when he comes through. There is one possible problem in attempting deflection shots as a target flies across your front. On machines with a slow frame refresh rate, the program may not detect collisions if they occur between frames. A perfect shot may be negated for this technical reason.

When you are directly behind the target, watch for indications of how he is turning. Then position the Gun Sight Reticle slightly in his path and shoot when he comes under the dot. If you can stay on his tail, watch for moments when the target is within the Gun Sight Reticle and fire. If you can match his speed and stay on his tail, you should eventually be able to bring him down.

Gun Sight Reticle Tic Marks

The twelve tic marks around the Gun Sight Reticle each represent 1,000 feet of range between you and the target. The broad band appearing around the Gun Sight Reticle marks the current range to the target. Figure 9-3 shows a Gun Sight Reticle indicating the target is 3,000 feet away. The broad band around the gun sight reaches from the top of the sight clockwise to the third tic. Three tics equals 3,000 feet.

The bands and tic marks on the Gun Sight Reticle are one way to keep track of the range to the target. As the range closes, the band shrinks, and vice versa. Because of this feature, the Gun Sight Reticle band is one of three readouts on the HUD that can tell you whether the target is getting closer, pulling away, or keeping a steady distance away.

Because of rounding, the target may not be flagged as IN RNG for cannon fire until the band shows it within 2,000 feet or less. In Figure 9-3, the Gun Sight Reticle band shows the target at 3,000 feet, which is shooting range. However, the In Range



Figure 9-3

Gun Sight Reticle
band indicating
target range of
3,000 feet

message has not popped up and the Range-to-Target readout shows the target at 0.60 nautical miles, still beyond range.

Prior to shooting, when all else is ready, check the band on the Gun Sight Reticle to be sure the target is within the 2,000 foot range. If so, fire.

Other Dogfight HUD Readouts

The Gun Sight Reticle is the only HUD feature unique to dogfights. A number of other HUD readouts that have been discussed previously are present in this Weapon mode and provide useful information. These are the Designated Target Box, Diamond-X symbol, the In Range message, the Weapons Remaining readout, the Range-to-Target readout, and the Closure Rate readout. If you are confident you understand how these might be of use in a dogfight, skip ahead to the next primary section, Using the Gun Camera to Aim.

Designated Target Box

The Designated Target Box marks on the HUD the aircraft currently selected as your target. During a dogfight, keeping track of the designated target is important because the predictor gun sight is basing its calculations on this target's speed and vector. The Gun Sight Reticle is positioned on the HUD in relation to the designated target. Shooting at a target other than the one designated within the target box is all but useless.

The Designated Target Box is discussed in Chapter 8.

Diamond-X Symbol

When the Designated Target Box moves outside the live area of the HUD, the Designated Target Box disappears and is replaced by the Diamond-X symbol. Turning in the direction indicated by the Diamond-X symbol is the quickest direct way to get the target back in view within the live area of the HUD.

The Diamond-X symbol is one of the key HUD readouts in a *Strike Commander* dogfight because it helps locate a target you can't see. If you turn in the direction indicated by the Diamond-X symbol, as tightly as you can, the superior turning capability of the F-16 should bring the target into view once more. This is known as "chasing the X." The Diamond-X symbol and chasing the X are discussed in Chapter 8.

In-Range Message

The message IN RNG appears on the lower left of the HUD when the target is within effective range of the cannon. The HUD must be in close zoom, as seen in Figure 9-3. Hits are unlikely to be scored if the cannon is fired when the target is not within range.

The In Range message appears on the HUD when the target is within 0.5 nautical miles, as noted by the Range-to-Target readout, or within three tics on the Gun Sight Reticle (3,000 feet). The message disappears if the target moves beyond these distances.

The In Range message is one of three sources of information on the HUD telling you whether the target is within range or not. (The others are the Range-to-Target readout and the Gun Sight Reticle.) As you prepare to shoot, keep your eye on one of them to be sure that your shots can hit.

Weapons Remaining Readout

The Weapons Remaining readout is also found at the bottom left of the HUD and tells you at a glance how many rounds of ammunition are left for the Vulcan cannon. You begin each mission with 1,000 rounds, although the readout shows only 999 at the start. Thereafter, each time you fire, rounds are expended and the number remaining decreases. When the Weapons Remaining readout shows zero remaining, you are out of ammunition and can no longer shoot the cannon on this mission.

If you have turned on the option Unlimited Ammo, the Weapons Remaining readout stays at 999 throughout the mission. This option is discussed in Chapter 6.

Range-to-Target Readout

The Range-to-Target readout is the last of the three HUD readouts that can tell you whether the target is within effective range of the F-16's cannon. If the range to target is 0.5 nautical miles or less, the target is within range. This readout is discussed in Chapter 8.

The Range-to-Target readout is useful during a dogfight because it keeps you informed about how close the target is, even when he is not within sight. It is one of the three readouts on the HUD that can tell you whether the range is decreasing, increasing, or holding steady.

This readout offers other important clues during a dogfight, especially when the target is not in sight. As the range becomes more narrow during a tight turning maneuver, the target may attempt a new maneuver rather than sit and take the cannon fire that he knows is coming. As you watch the range shrink, get ready to respond to a new maneuver. Also, a sudden reversal in the trend of the closure rate (see below) normally indicates a new maneuver from the target. You can't see this change but the Range-to-Target readout will indicate something is happening.

Closure Rate Readout

Like the Range-to-Target readout, the Closure Rate readout is especially useful when the target is out of sight. In a tight turning chase, the Closure Rate readout is normally small, indicating that you are slowly gaining on him, or he is slowly pulling away, or the roles may be reversed. A sudden rapid increase in the closure rate normally indicates that the target has changed maneuvers. If you can guess what the enemy is doing to shake you off his tail, you may be able to put yourself in a great position from which to shoot.

The Closure Rate readout is discussed in Chapter 8.

Using the Gun Camera to Aim

The Gun Camera is a multifunction display that can be called up from the cockpit to view what is directly in front of your F-16 and its cannon. The Gun Camera can be used to aim the Vulcan cannon as an alternative to the Gun Sight Reticle. Figure 9-4 shows the Gun Camera with a TU-95 in view. This camera is discussed in Chapter 5.

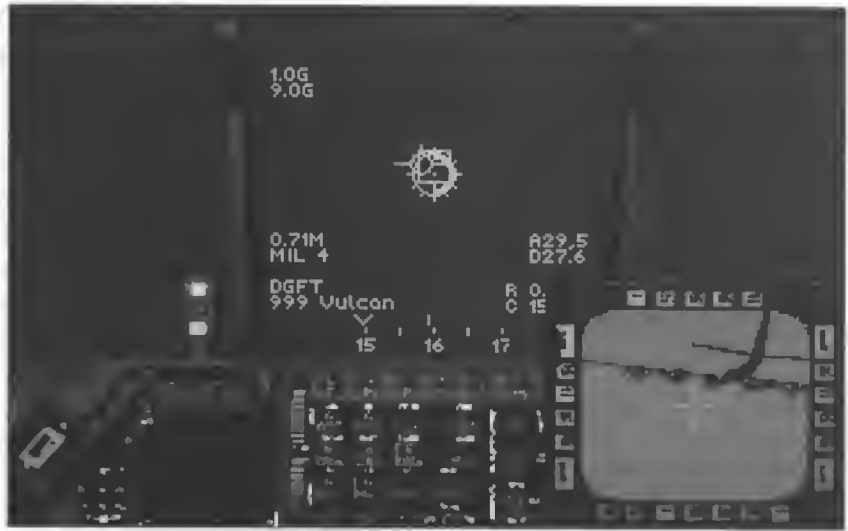


Figure 9-4
Gun Camera view
of a TU-95

Gun Camera Restrictions

The Gun Camera looks out from the front of the F-16, displaying what is directly in front of the nose. In Dogfight Weapon mode, cross-hairs appear on the camera screen as well. Shells fired from the gun head directly for the spot marked by the intersection of the cross-hairs. Theoretically, then, you can aim the gun by placing the Gun Camera cross-hairs on the target. However, this is not as simple as it sounds, for several reasons.

First, the Gun Camera gives no range data. When the target comes within 15,000 feet of the camera it changes from a dot to a detailed picture called the Target View. This view may be helpful for identifying targets that are too far out to be identified visually, but 15,000 feet is beyond gun range. The Target View remains the same whether the range is 1,000 feet or 15,000. To determine if the target is within range, you must look elsewhere.

Second, the cross-hairs show the direction the shells will take when fired, but there is no guarantee the target will still be there when the shells arrive. If the target holds its position until the shells reach its range, they will hit. But if the target moves away from its position, the shells will likely miss.

The closer the target is to the F-16, the better the chance of scoring a hit by aiming with the Gun Camera, because the target has less time to move out of the position you fired at.

Gun Camera versus Gun Sight Reticle

The Gun Camera is decidedly inferior to the Gun Sight Reticle for aiming the cannon in a dogfight. To determine when the gun is within range, you must look up to the HUD. Once your eyes are off the camera you can't tell if the cross-hairs are on target or not and a shooting opportunity may be missed. Watching the camera keeps your eyes away from the HUD in general, preventing you from reading all the information helpfully placed there.

The Gun Camera sight does not compensate for the time it takes the shells to travel before reaching the target. A slight movement by the target in the interim may make the shells miss.

When the HUD is in the close zoom, part of it is obscured by the Gun Camera. If the camera is the second MFD opened, it covers up the Missile Warning Lights, which should almost always be visible.

In contrast, the Gun Sight Reticle is in the center of the HUD, making other information found there much easier to check. The Gun Sight Reticle includes range information, so you know when the target is within range. The Gun Sight Reticle is also a predictor gun sight that shows where the shells will hit if fired immediately, assuming the target is within gun range.

If you find that the Gun Camera works best for you, then by all means use it. But for most people, learning to use the Gun Sight Reticle is the best way to shoot the cannon accurately.

Dogfight Game Options

Several of the game options can make dogfights significantly easier to win. These are Unlimited Ammo, *G* Effects, Auto-Targeting, Smart Targeting, 360 Degree Radar, 360 Degree Lock, and Smart RAW Scope. Unlimited Ammo is discussed earlier in this chapter. The other options are discussed further in Chapter 6. Remember that game options incur a scoring penalty. If you are concerned about your game score, keep the number of options in effect to a minimum.

G Effects

Turning off the *G* Effects option makes flying during a dogfight much easier. Dogfights in *Strike Commander* are mainly a series of turns. Tight turns increase the gravitational forces on you and your F-16. Without the forces of gravity in effect, you can pull 9 *G* turns that normally could not be maintained without causing you to black out.

Allowing continual 9 G turns makes it much easier to chase the Diamond-X symbol that indicates how to turn to reacquire a target. Without concern for G effects, roll the F-16 so the Diamond-X is at the top center of the HUD and pull back all of the way on the stick. This places you in the tightest turn you can make, and one that the forces of gravity would normally preclude for longer than a second or two.

Against most aircraft in *Strike Commander*, chasing the X through continual 9 G turns and maneuvers quickly closes the range to the target. As the Range-to-Target readout approaches 0, be prepared for a countermaneuver by the target.

For the casual *Strike Commander* player, turning off the G Effects option makes the game more fun. It is much easier to fly and shoot down aircraft. Flying with G Effects on requires much more skill and dogfights are much more difficult. With G Effects turned on, the artificial intelligence of the program may prove to be too stiff an opponent for new players, who will have little luck shooting down aircraft while unconscious.

Auto-Targeting

When you are in Dogfight Weapon mode, the Auto-Targeting option automatically selects the nearest target when one or more come within radar range. The target is immediately marked with the Designated Target Box, or Diamond-X symbol if not within the live area of the HUD. In addition, the position of the selected target becomes part of the calculations that place the Gun Sight Reticle on the HUD. Auto-Targeting is discussed in Chapter 6.

The Auto-Targeting option can be a slight handicap in a dynamic air battle. Once you rely on Auto-Targeting, you forget the **[T]** key. There are times when you may wish to change targets quickly, and then you need to remember how the **[T]** key works.

For example, a target remains designated after being shot down until it hits the ground. Only at this point does Auto-Targeting select a new target, if one is available. You, however, may wish to choose another target more quickly than that. Or, you may wish to select another target once you have crippled the one currently designated.

If the option Smart Targeting is not also on, Auto-Targeting may select a friendly aircraft as a target.

The Auto-Targeting option is a useful dogfight option for new players, but once you get used to using the **[T]** key to switch targets, it can be turned off, saving you the scoring penalty.

Smart Targeting

The Smart Targeting option prevents you from selecting a friendly aircraft as a target. This is useful in a swirling air battle because you can accidentally target your wingman. Pressing the **[T]** key cycles through only enemy aircraft targets, and the Auto-Targeting option does not select friendly aircraft, either.

This is a very useful option that can prevent big mistakes and the wasting of time while you visually identify what aircraft you have selected. It should be turned on for almost everyone. Only players wanting the stiffest challenge should consider adding the complication of visual target identification to their game.

360 Degree Radar

The 360 Degree Radar option gives your air radar the capability of looking entirely around you, not just to the front as normal radar does. It is discussed in more detail in Chapter 5.

360 Degree Radar helps you keep aware of what's happening in a dogfight. You can look at it to see enemy planes even when they are behind you. Without this option on, radar looks only forward.

Some players may prefer to keep the radar off so it doesn't obscure part of the HUD. If this is a concern, call it up, take a look at the situation, and then turn it off.

360 Degree Lock

When the option 360 Degree Lock is turned on, you never lose radar lock on your designated target. This is very useful in a dogfight because the Diamond-X symbol never turns off, regardless of where the target is in relation to your F-16. Without the 360 Degree Lock, the Diamond-X symbol goes away once the target gets behind you.

For this reason, 360 Degree Lock is one of the more useful options in a dogfight. New pilots especially should use it.

Smart RAW Scope

The Smart RAW Scope option is another tool helping you maintain awareness of what is going on in a dogfight. With this option on, all radar-emitting sources within range of your F-16 are marked on the scope. When the option is off, only those radar sources pointed at your aircraft are marked. The RAW Scope is also known as the Threat Warning Indicator and is discussed in Chapter 4. The Smart RAW Scope option is discussed further in Chapter 6.

In a dogfight, the Smart RAW Scope helps keep you informed about where other aircraft are around you. In this capacity it partially duplicates your air-to-air radar. Because the RAW Scope is normally in view to the bottom left of the HUD, you can turn off the radar without losing all of its benefits.

Dogfight Tactics

To win a dogfight, position your F-16 behind the target but with your nose pointed slightly in front of him. Ideally, you are directly behind him. Next best is looking down at him or up at him from below, and from slightly behind. These positions offer the best chance of shells striking the target, because more of it is exposed. Keep your Gun Sight Reticle steady and directly on target, or across the expected path of the target. Shoot when the target is within the Gun Sight Reticle or flies under it, and is within range of the Vulcan cannon.

Achieving a good shooting position depends on flying skill, the capabilities of the F-16, and maintaining situational awareness. There are times when survival is more important than scoring hits, especially when you are out of ammunition. In these situations, the same factors apply to keeping out of an enemy's sights and escaping.

Flying skill comes with experience. Basic flying skills are discussed in Chapter 3. Advanced flying skills, especially maneuvers useful in combat, are discussed in Chapter 14. At the end of this chapter a number of dogfight situations are discussed, including specific maneuvers that can be useful in each.

Remember that *Strike Commander* is a simulator and a game. How best to dogfight in the game is often not good practice for real pilots. This is partly because of the limitations of the artificial intelligence that controls enemy pilots, and partly because of limitations on the flight models.

Basic *Strike Commander* Dogfight Tactics

The basic dogfight tactic in *Strike Commander* is to get into a turning chase and take advantage of the F-16's maneuverability to close the range and shoot down the target. Although this rarely works out exactly as planned, it is inexorable and forces the target to respond or risk being shot.

Your opponent is aware of the capabilities of the F-16 and will attempt to evade the trap that an extended turn can become. His

options are to change speed, break horizontally, climb, or dive. In *Strike Commander*, enemy pilots almost never climb or dive.

In a dogfight, turn after an opponent and keep turning after him. The direct way to do this is to chase the Diamond-X symbol on the HUD, as discussed earlier. Watch the Range-to-Target readout on the HUD to follow how close you are getting to the target. As the range to closure approaches 0 nautical miles, expect an evasive maneuver. If you can follow the attempted maneuver, it may present an excellent shooting position.

Chasing the X in this manner is a poor air-to-air tactic in real life. It bleeds off energy and leaves you predictable. If the enemy can surprise you or has a good wingman, you are probably dead meat. A rule of real combat is that a sustained turn gets you killed. In *Strike Commander*, however, enemy pilots rarely surprise you. Their wingmen cannot be ignored, but can be evaded.

In a sense, a *Strike Commander* dogfight resembles a chess match. By getting a target into a turning chase, you have seized the initiative as a chess master might. Checkmate is inevitable because of the superb maneuverability of the F-16. Typically, the target attempts a new maneuver, such as a break turn away from the current turn, as a gambit to temporarily interrupt your initiative. This only plays into your hands, because although the target maneuver breaks the turning chase, it gives you the opportunity to shoot. Your opponent is programmed to take that risk for the chance of getting out of the trap the continual turn is leading to. To get a good shot you must maintain an awareness of what he is attempting and predict where the shot opportunity will be.

If you miss the shot or don't even get it off, turn after the target as quickly as you can to regain the initiative. This starts the turning dance all over again. Keep the pressure on. If you allow his gambit to succeed, you lose the initiative and may find yourself in his sights.

How long the chase can be maintained depends on your fuel and ammunition, as well as on what other aircraft are doing in the sky.

Very experienced *Strike Commander* pilots are most successful at extremely low altitudes. They are capable of sustained combat below 100 feet, when the Altitude Above Terrain readout reports 0 altitude. At this level, enemy pilots are so concerned about avoiding crashes that they do little evading and are easy to shoot. This type of flying is not for the inexperienced, however, because the slightest slip sends you into the ground. Try fighting at 200 to 300 feet first, and stay slightly above your opponent. In this situation he continually strives to get lower and makes flying mistakes.

Enemy Pilot Artificial Intelligence

The artificial intelligence of enemy pilots in *Strike Commander* is somewhat limited. When you understand what enemy pilots are attempting to do, they become more predictable and easier to kill.

The first priority of enemy pilots is to avoid being shot down. If you are threatening them by being at their rear, they concentrate on getting away from you. Once free of you, they next concentrate on getting onto your tail and threatening you. To carry out both of these objectives, they concentrate on tight turns, at the maximum *G* force they can maintain. They do not dive or climb as part of a maneuver. The result of their constant high-*G* turns is a continual loss of airspeed and altitude. They often end up on the deck in near stall conditions.

When flying at very low altitudes, enemy pilots are aware only of the ground altitude directly below them. They do attempt to avoid crashing into the ground, but in very rough terrain they can easily miscalculate. They generally do a poor job of avoiding stalls and can stall out too low to recover. A stalled aircraft can be a sitting duck.

When an enemy aircraft is damaged, the pilot makes no adjustment in his flying. He attempts the same maneuvers as he might when undamaged. As a result, a damaged aircraft is more apt to crash, stall, or leave itself open for an easy shot.

Enemy pilots try very hard to avoid any possible collisions, both with other aircraft and the ground. This can lead to attempted maneuvers that stall.

These basic limitations of your opponent's artificial intelligence are constant regardless of the level of difficulty and pilot intelligence level.

F-16 Capabilities

The turning ability of an aircraft is critical in dogfights. The F-16's best corner speed is 450 knots. This means that the aircraft can turn 360 degrees in less time at that speed. This is different from turning tightly in a small radius. Given the choice between turning 360 degrees in 30 seconds at a radius of 1,000 feet or turning 360 degrees in 6 seconds at a radius of 2,500 feet, an ace pilot always prefers the second option, the quicker turn. This is the advantage of the F-16, being able to turn quickly.

The F-16 turns with its tightest radius at 350 knots, but this is of less importance in combat. The best corner speed and best minimum turn radius speed are both influenced by altitude. Above 8,000 feet the speeds need to be higher.

The F-16 can outmaneuver any aircraft in *Strike Commander* except the F-22. In addition, the F-16 tends to lose less speed in a turn than other aircraft. Because most dogfights are a series of turns, these abilities give the F-16 an advantage because it can turn more quickly. By being able to turn more quickly, it can maneuver more easily and maintain a higher airspeed at the same time. Opponents turn slower, although possibly tighter, and lose both airspeed and altitude.

You should be able to pick your spots for shooting and be able to break off if under attack yourself. The high turning rate and airspeed are very useful when attempting to dodge enemy missiles.

Airspeed

Try to maintain an airspeed of 450 knots to maximize the quick turning capability of the F-16. At the same time, however, keep aware of the closure rate. If you are closing on the target from behind too fast, it may be very difficult to line up a shot when the opportunity is there.

The *Strike Commander Technical Supplement* recommends that the closure rate be close to zero when you shoot. This is the ideal for rear aspect shots because you are maintaining a steady distance from the target. If you can keep up with any maneuvers by the target at this point, you may get several shots. However, when you have a good deflection shot at the top or bottom of the target, you are normally leveled off while your opponent is making a banking turn across your path and under the Gun Sight Reticle. In this case, a steady closure rate is not an important concern and practically impossible to achieve.

Closing too fast also risks taking you past the target, leaving you vulnerable to shots from the target as you fly by. If you see that the closure rate is high and that you are behind the target, cut back on the throttle setting or hit the air brakes (press the **B** key). Don't leave the brakes on for more than a second or two. If they don't slow you down enough, hit them again.

Giving up speed is always risky because speed is so critical to making maneuvers. But lining up a good shot is the goal and giving up speed is a good exchange for a chance at a kill.

Situational Awareness

Maintaining situational awareness is the term pilots use for keeping track of where they are in the sky, relative to the ground, and where other aircraft are, both enemy and friendly. That's asking

a lot during a dogfight. New pilots should make a mental list ranking the factors that make up the situation. Begin by keeping aware of the most important, and then add more as you become able to handle them.

Most critical to situational awareness is knowing when someone is on your tail, or in your six o'clock position. One way to do this is to check the RAW Scope continually. If an aircraft is on your tail, an inverted T representing the enemy appears in the bottom half of the scope. If your opponent is tracking you on radar as a target, his icon glows brightly. This means he is close to shooting. 360 Degree Radar can also indicate enemy aircraft behind you. Your wingman may let you know that someone is on your tail.

The next critical factor in a situation is probably knowing how close you are to the ground. Occasionally check the Altitude Above Terrain readout on the HUD to keep aware of how high you are above the ground. If you are below 2,000 feet, don't attempt a split S or other diving maneuver. In *Strike Commander*, dogfighting at very low altitude (in the weeds) is a very useful tactic because of the limitations of your enemy's intelligence.

Next in importance, and related to checking your six o'clock position, is keeping track of the aircraft that you have designated as your target. Your target can reverse roles with you, so keep aware of where he is. An old pilot expression is "lose sight, lose the fight." Keeping the target in sight is difficult because the turns of a dogfight normally keep the enemy out of the view from your cockpit. This is what makes the Diamond-X symbol so important, because it indicates where the target is, and therefore how best to turn.

The RAW Scope and air-to-air radar can supplement the Diamond-X symbol by giving you a rough idea of where a target is. In addition, two camera views, provided by the Player-to-Target and the Auto-Target Tracking Cameras, can be very useful in showing your relation to the target. These cameras are discussed below.

Keeping track of other nearby aircraft is useful during a dogfight, but usually you are too busy to do so. If you can watch your rear, note the closeness of the ground, and keep track of your target, you are maintaining the minimum acceptable situational awareness. Concentrate on shooting down the target you are after and let up only if someone gets on your tail. At that point, break off your attack and evade the aircraft at your six o'clock position. Once he is off your tail, go back on the offensive against the first enemy you can acquire.

In real combat, a pilot who spends most of his time looking through the HUD will soon die. In air combat, his eyes must be everywhere: out the sides, through the canopy, over his shoulder. He looks through the HUD only when preparing to shoot. In *Strike Commander* this is not so. Despite the great interface features, it is still somewhat cumbersome to look around. The HUD has been enhanced to help keep you aware, so take advantage of it.

Player-to-Target Camera

The Player-to-Target Camera provides the perspective of a view from behind your F-16, looking toward your designated target. Figure 9-5 shows a Player-to-Target Camera view.

To see where the target is, press the **[F7]** key. Quickly note where he is. For example, in Figure 9-8, the target is to the right at roughly the same altitude. Don't linger in this camera view. As soon as you understand where he is, Press the **[F1]** key to get back to the cockpit. It can be tough to fly the F-16 from this exterior view, and lingering in any camera view is dangerous because you can't see the Missile Warning Lights.

Auto-Target Tracking Camera

An alternative to the Player-to-Target Camera is the Auto-Target Tracking Camera, turned on by pressing the **[Y]** key when the target is out of sight. This camera pans around from the Close Cockpit view until the target is visible. Follow the panning process



Figure 9-5
Player-to-Target
Camera view

to see how you must turn to reacquire the target in sight through the windscreen. If the camera doesn't immediately start to pan when you press the **[Y]** key, pull the joystick in the direction of the target (as best you can guess) and the camera should begin to pan.

This camera simulates looking through the canopy to keep the target in view. Because of interface limitations, you cannot look through the canopy and continue to pull on the stick. This camera allows you to do this to a degree.

Again, don't linger in this camera view. It can be very disorienting if held for a long period. Use it in short bursts to orient yourself relative to your target, as if you are looking up quickly through the canopy, and then turn it off. Pressing either the **[Y]** key or the **[F1]** key turns off the camera, and returns you to the Close Cockpit view.

Head-on Shots

Many of the *Strike Commander* air-to-air engagements begin as head-on meetings between you and the enemy. If you know the opposing pilots are not aces, consider trying a head-on shot as they approach. In most head-on engagements, the oncoming fighters fly right at you and don't break until quite close.

Place the Gun Sight Reticle dot on the approaching target and hold it steady. If you are lucky, the target holds its course and can be shot at. In this case, open fire beyond normal gun range at 0.7 or 0.6 nautical miles. This can be effective because the target is closing so fast that it will be within range when the shells intercept it.

If you detect the beginning of a turning maneuver, you may be able to lead the plane slightly and shoot as it comes within the Gun Sight Reticle. Be careful, though, because turning to lead them increases the possibility of a head-on collision.

Head-on shots are much more risky against ace opponents. You are much more likely to get shots back from them, and they are aces because they can shoot well.

Horizontal Maneuvers

During a dogfight you'll often find yourself chasing a target through a tight turn. If you are able to turn inside the target's turn (and the F-16 should be able to), the range gradually closes. If the target doesn't do something, he will eventually enter your sights. At this point continue pulling past him until your nose is

leading his aircraft. Then ease up the stick to steady the gun sight. When he flies under the gun sight, fire.

This works well in *Strike Commander* and is fun, but a real pilot who continually pulls *G* forces in turns is referred to as having “*G* for brains.” Pilots are trained to use intelligent tactics instead of turning like this and hoping for the best.

In *Strike Commander*, an enemy pilot rarely waits for you to maneuver his plane under your guns. He sees the range closing as well and knows what is coming next. So, he does what he can, which is to roll and attempt to break in another direction. The artificial intelligence of enemy pilots is such that they make most of their maneuvers without diving or climbing: to break away from a tight turn they usually just turn in the opposite direction.

Watch for changes in the Diamond-X symbol as the Range to Closure readout approaches 0. Be prepared for the target to roll 180 degrees and break the other way. If you are looking out from the panned view of the Auto-Target Tracking Camera, simulating what a real pilot would be doing, you won’t be surprised by this.

To take advantage of the enemy’s break turn, ease up on the stick as the Diamond-X symbol shifts. Roll with the Diamond-X, following the break turn if you can. Be ready for the target to pass suddenly across your front. If you can lead him slightly and steady out, you may have a good shot at the top of his aircraft as he banks directly in front of you.

Even enemy aces seem to prefer this horizontal maneuver during a dogfight. Once you get used to it, you can add significantly to your score of kills.

Using the Third Dimension

Although the enemy seems to prefer horizontal maneuvers in a dogfight, turning only to the left or right, there is no reason for you to limit yourself. Maneuvers in the third dimension, either climbing or diving, are very important in real combat and can be useful to you as well.

Three-dimensional maneuvers in combat are advanced flying techniques. New pilots don’t need to concern themselves with them at first. If you chase the X during dogfights you may unconsciously perform three-dimensional maneuvers, but that is different from understanding the situation and planning a maneuver that gives you a combat advantage.

Three-dimensional maneuvers become more important when you play with the optional *G* Effects turned on. In this case, pulling extended high-*G* turns is not possible and you must fly more

like a real pilot to overcome both gravity and the enemy. However, even with G forces in effect, the flight models and artificial intelligence of *Strike Commander* mean the basic turning chase still works well.

During a dogfight, climbing or diving is usually done in conjunction with a turn as you chase a target. The movement up or down is followed by an opposite movement, as the turn continues. This up-down or down-up combination is called a Yo-Yo. Various types of Yo-Yo are discussed in Chapter 14.

The Yo-Yo was developed to take advantage of the physics of flight. As noted earlier, climbing reduces speed and diving increases speed. The Yo-Yo is a combination of climbing and diving that first decreases speed and then increases it, or vice versa, for the purpose of gaining a better shooting position against a target.

Diving

Any kid knows that to start a Yo-Yo, you throw the toy downward to build up speed for the roll back up the string. The same is true in air combat.

Assuming that your opponent maintains a relatively stable altitude as he turns, diving in conjunction with a turn increases airspeed. If you are chasing an enemy and notice that your airspeed is too low, a mild dive as you turn can increase speed to a more desirable level.

As the chasing turn of dogfight continues, check the Closure Rate readout. If you are slowly closing at 20 to 50 knots, you may want to speed up. If you are not closing at all, but falling behind, you are headed for trouble because the enemy is getting away and probably trying to get on *your* tail. One way to increase speed is to increase the throttle. The other way is to dive.

Roll slightly to change the angle of attack of the wings downward, decreasing lift and putting you into a slight dive. This your speed, even as you maintain the turn as much as possible.

Now watch the Range to Target readout to monitor how close you are coming to the target. As you come within shooting range, pull back on the Yo-Yo string(so to speak) by climbing slightly.

Climbing

Climbing slows your aircraft by bleeding off airspeed. From the lower altitude you dove to earlier, watch the Range to Target readout to see when you have reached the shooting range of your cannon. Once within range you'll want to slow your rate of closure so that the target stays within range for as long as possible.

When you are within range, roll back slightly to climb. This bleeds off some of the airspeed you picked up in the dive, lowering your speed to something close to that of the target. By climbing you have gained back some of the altitude you lost in the initial dive. If done properly, you have closed the gap to the target and put yourself in a good shooting position at the same time.

Desperation Tactics

Another weakness of the program's artificial intelligence is that enemy pilots seem uninterested in the energy advantages of being high. This, combined with their tendency to maneuver horizontally, means that dogfights generally get closer and closer to the ground as they continue. The continual turns bleed off altitude and height, and the enemy pilots rarely climb to recover.

This offers you one opportunity when things are really desperate, such as being out of ammunition or having a nonworking cannon: continue to dogfight as if you do have ammunition. The enemy will continue horizontal maneuvers, trying to evade. As the altitude drops the chance of enemy pilot error increases. Given enough time, most enemy pilots eventually screw up enough that they put themselves into an impossible situation and crash into the ground. All you have to do is keep up the pressure until he does.

Be aware that this tactic is not a good idea if other enemy aircraft are still around and have nothing better to do than come after you.

STRAFING GROUND ATTACKS



Pilots in strafing ground attacks use either rockets or the Vulcan cannon to destroy targets on the ground. These weapons can be used against any ground target except runways, but they are most useful against smaller targets that can be knocked out with a limited amount of damage. Examples of suitable strafing targets are vehicles, small buildings, and anti-aircraft guns. Larger targets, such as ships, bridges, and large buildings, require a great deal of damage to destroy, and must be hit many, many times with the cannon or rockets.

Ground attacks conducted by strafing are among the most difficult tasks that face Wildcat pilots. When you get into the *Strike Commander* game, you will find that the first several missions go relatively easily, mainly because they are mostly air-to-air missions and because you are Stern's wingman. Later, you will have to bomb an armored column in South America and your steady progress through the missions will slow down. The South American mission will probably take several attempts before you succeed mainly because of the difficulty of taking out mobile anti-aircraft weapons without being shot down yourself.

Why is strafing so difficult? First, it requires precise flying at low speeds and close to the ground. The margin for error is small. Second, it is much more difficult to locate and identify targets on the ground compared to targets in the air. This, in turn, leads to the third factor: strafing targets are normally small, and even when spotted there is not much time to line up and shoot before you fly

past. For strafing attacks, there are no equivalents to a lot of the gadgetry that makes air combat easier to master.

A fourth factor making strafing difficult is that, normally, one or more enemies on the ground are shooting back. Ground defenses are either antiaircraft guns or missiles. Guns may be mobile and self-controlled, or individual fixed mounts, or several fixed mounts controlled by a separate radar installation. Surface-to-air missiles may be fired from mobile, self-controlled launchers or from fixed launchers controlled by a separate radar source. Strafing attacks can be directed against ships, and ships also defend themselves with guns or missiles.

To sum up, strafing attacks are especially difficult because the flying is dangerous, the targets are hard to find, the targets are hard to hit, and ground attack missions usually encounter stiff defenses.

Strafing does have some good points. First, ammunition is cheap. Vulcan cannon ammunition is free, because you don't have to spend money to replenish it as you do for all other weapons. Rocket pods are relatively cheap. Although bought in pairs at \$10,000 each, a pod contains 19 rockets. A pair of pods can be fired at 19 different targets. Pods that are brought back from a mission partially full are refilled at no cost. In this case, rocket pods are essentially free, just like Vulcan ammunition.

Strafing can provide a lot of bang for your buck. You can take out a number of small targets for a low cost, instead of using up more expensive weapons. For example, a pair of Mk82 bombs cost as much as a pair of rocket pods. There is no guarantee that you can drop a pair of bombs accurately, although they take out any medium to small target they hit. Rockets also take out most small to medium targets they hit, but if you miss you can try several more times, and still not approach the cost of the two bombs.

Rockets can be fired in multiple salvos, covering a small area with a lot of firepower. Quickly putting multiple rockets onto a small target may leave a lot of holes in the ground, but just one hit is probably enough to take the target out. This can help make up for their lack of accuracy while still keeping costs relatively low.

Rockets have a limited standoff capability, allowing you to fire at a target without being shot at yourself—very useful against antiaircraft guns.

Successful strafing requires an understanding of the problems these types of ground attacks present, plus experience and practice overcoming those difficulties. If you can master rocket strafing

alone, leaving cannon strafing to the real hot-shots, you can add significantly to the success of the Wildcats and to your enjoyment of *Strike Commander*.

The Strafe Mode HUD

When either the Vulcan cannon or LAU-3 rockets are activated in Strafe Weapon mode for air-to-ground combat, a new feature appears on the heads-up display (HUD) that is called the Strafe Reticle. This sight helps determine when to shoot. In addition, a number of previously discussed features are also present to help you achieve and maintain situational awareness.

Prior to a strafing attack, zoom in the HUD so symbols are larger and easier to read (press the **F1** key). Contrary to the suggestion for air combat, leave the Pitch Ladder and the optional tapes turned on (see Chapter 6). Figure 10-1 shows a HUD prepared for a strafing attack with rockets.

The Strafe Reticle

The Strafe Reticle is a circle with a dot in the center that appears on the HUD when it is in Strafe Weapon mode (STRF). It is the only HUD aid for aiming your weapons when strafing.

How the Strafe Reticle Works

The Strafe Reticle indicates on the HUD where your cannon shells or rockets will hit if fired immediately and if the F-16 is in



Figure 10-1
HUD prepared for a
rocket strafing
attack

steady flight. The dot in the center of the Strafe Reticle is the point of impact.

The Strafe Reticle shows the point of impact at the maximum effective range for either strafe weapon. It is set for the range of the cannon when that weapon is activated, and set for the range of the rockets when they are activated. The position of the Strafe Reticle is determined by a computer onboard your F-16 that takes into consideration the speed and vector of the aircraft plus the range of the weapon.

Using the Strafe Reticle

To hit a ground target while strafing, position the Strafe Reticle on the target and fire. However, firing like this works only if a few preconditions have been met: first, the target must be within range of the weapon. Cannon fire or rockets fired at targets out of range will fall short and miss. Second, the reticle and aircraft must be steady. If the F-16 is turning or changing altitude when the weapon is fired, the motion of the aircraft will pull the shells or rockets off the target.

The Velocity Vector Indicator should be centered within the HUD, not to the left or right side, even slightly. The Velocity Vector Indicator should also be steady, not moving up or down. It does not have to be directly on the Strafe Reticle, just steady as described.

Position the Strafe Reticle such that it is on the target and steady. Any heading and altitude corrections you need to make should be slight as you approach firing range. Use very slight stick movements or the rudder to make adjustments. Then hold steady for a second or two before firing.

Other Strafe Mode Readouts

Although the Strafe Reticle is the principal HUD feature you'll need during a strafing attack, other HUD features are also useful when making a strafing run. These include the In Range message, the Altitude Above Terrain readout, the Airspeed Tape, the Weapons Remaining readout, the Selected Weapon readout, the Pitch Ladder, and the Range-to-Target readout. Most of these HUD features can be seen in Figure 10-2.

In-Range Message

The In Range message pops up when the designated target is within range of the cannon and if the HUD is in the close zoom. Once the message has appeared, if the Strafe Reticle is on the target and the F-16 is steady, you have a good chance of hitting.



For some unknown reason, Strike Commander doesn't allow you to designate a strafing target when rockets are activated. This means you don't see a Range-to-Target readout on the HUD and no In Range message appears for rockets.

Altitude Above Terrain Readout

Strafing attacks are most commonly conducted at very low altitudes, 500 feet or less. *Strike Commander* pros routinely strafe within 50 feet of the ground with the Altitude Above Terrain readout reporting 0 feet of altitude. Even a couple of hundred feet of altitude is very close to the ground for a high-speed jet aircraft. Continually check the Altitude Above Terrain readout to be sure that you are at least 100 or 200 feet above the ground. Flying any lower is very risky, because diving for only few seconds or miscalculating the height of an approaching hill can lead to a crash.

At the same time, you don't want to get too far over 500 feet because you need to be low to use the terrain to mask your approach. Also, when you come in high you must dive slightly to aim at targets on the ground.

When strafing, get into the habit of keeping one eye on the Altitude Above Terrain readout.

Airspeed Tape

The Airspeed Tape keeps you informed of your current speed. As you approach for a strafing run, you want this speed to be below 400 knots and perhaps below 300. Watch this tape to see if



Figure 10-2

HUD prepared for a gun strafing attack

you need to reduce the throttle or use the air brakes to get speed down quickly.

Without this tape on, the only information you have about speed is the Current Mach readout, which provides only a rough estimate of your airspeed. For more precise information, refer to the Airspeed Tape.

Movement of the tape also indicates if your airspeed is steady, increasing, or falling. You generally want the airspeed falling as you approach, as steady as possible while you shoot, and then increase as you pass the target to come around for another run.

Weapons Remaining Readout

During a strafing attack the Weapons Remaining readout reports the number of rounds left for the Vulcan cannon or the number of individual rockets left in all pods, depending on which weapon is activated.

For example, if you had 4 rocket pods onboard, before firing the readout would show 76 remaining, or 4×19 . If you fired one salvo of 4 rockets, the Weapons Remaining readout would show 72 remaining.

Selected Weapon Readout

The Selected Weapon readout reports which weapon is activated. Selecting weapons and changing the selected weapon are discussed in Chapter 2.

When you select the Vulcan cannon, the readout says VULCAN. If you choose rocket pods, the readout says LAU3. These are the only two weapons that may be selected in Strafe Weapon mode.

Pitch Ladder

The Pitch Ladder is an optional HUD feature that does have some use in a strafing attack. It can tell you at a glance whether the F-16 is holding its pitch steady or not. If the Pitch Ladder is steady, then pitch is steady, and you can shoot without projectiles being pulled off the target. If the ladder is revolving, either up or down, then pitch is not steady and weapons will not likely hit where the Strafe Reticle is pointing.

Range-to-Target Readout

The Range-to-Target readout appears only when you can designate a target. In Strafe Weapon mode this occurs only when the

cannon—not rockets—is activated. When you have designated a target, this readout reports the range, in nautical miles from your F-16 to the target. The cannon is within range to fire when the target is 0.5 nautical miles away, or less. When you get this close to the target, the In Range message also appears on the HUD.

Locating Targets

Successful strafing attacks are difficult partly because the F-16 is so fast. Rookie pilots find themselves flying past ground targets before lining up a high percentage shot. Even if you spot a target in time your trouble's not over—there can be problems distinguishing a dangerous target from one that doesn't pose a threat. You may also find it difficult to determine if a possible target has been destroyed or is still active. All of this locating and identifying must be done while the F-16 is flying dangerously low and possibly under fire.

The primary means of finding ground targets is air-to-ground radar. You may spot radar-emitting ground targets on the Threat Warning Indicator, even before they are picked up on your air-to-ground radar. After your Threat Warning Indicator and air-to-ground radar orient you toward a target, your eyes have to take over, finding it through the windscreen and using the HUD to line up a shot. The Gun Camera can also be used to help find and identify targets.

Threat Warning Indicator

The Threat Warning Indicator reports the presence of any radar-emitting sources that are facing your F-16. In *Strike Commander*, ground targets that emit radar signals may be controlling antiaircraft guns or surface-to-air missiles (SAMs). Figure 10-3 shows a Threat Warning Indicator that has several radar-emitting ground targets on it.

Ground radar sources picked up on the RAW Scope are normally the most dangerous ground targets and the one's you'll want to destroy as soon as possible. Once a radar-emitting target is picked up on the RAW Scope, use air-to-ground radar to determine precisely where it is located. Targets normally appear on the Threat Warning Indicator before they can be seen on ground radar.

The Threat Warning Indicator is discussed in more detail in Chapter 4.

Figure 10-3
Threat Warning
Indicator revealing
several ground
radar emitters



The Smart RAW Scope is an optional improvement of the Threat Warning Indicator that is discussed in Chapter 6. When on, this option displays all nearby radar emitters, even those not facing your F-16.

Air-to-Ground Radar

Air-to-ground radar reports the location of all possible ground targets within radar range, not just those emitting radar signals. Possible targets are indicated as blips on the screen. Runways show up as large rectangular blips.


Ground targets can be spotted on radar long before than can be seen by the eye. For this reason, radar is your primary tool for finding targets. Make turns as necessary to head directly for a target spotted on radar and then watch through the windscreen for it to appear. The sooner you can spot a target, the sooner you can begin maneuvering to line up a strafing run.

To see this, load up a search-and-destroy training mission. Turn on your air-to-ground radar and then autopilot into Halverston. As you fly around the city, watch the targets appear on the radar, before you can spot them visually.

Ground radar can be enhanced with several options (see below). It is also limited in its ability to distinguish among targets, and between live and destroyed targets. Both of these limitations increase the difficulty of strafing attacks.

Ground Radar Options

The ground radar screen can be magnified to make it easier to distinguish individual targets within a group. As you fly close to

the concentration of buildings in downtown Halverston, magnify the ground radar by pressing the  key. Notice how the targets spread out under magnification, making them easier to distinguish.

Magnification can be useful when you are trying to distinguish antiaircraft defenses among a group of targets, such as several buildings or an armored column. In this case you have to get a visual image of how the targets are arranged below and then, as you circle back to attack, magnify the group and match the radar screen to what you have seen visually. Once you have decided where the more dangerous targets are, you can use the radar to help line up approaches toward them or avoid them.

Ground radar can be enhanced by turning on the 360 Degree Radar option, as discussed in Chapter 6. With this option on, ground radar spots targets all around you, not just to the front of your F-16.

Identification Limitation

When you are approaching a large number of ground targets, only a few may be antiaircraft weapons. Generally, you'll want to spot these quickly and destroy them first to eliminate any danger while you leisurely mop up the remaining targets. Unfortunately, on radar a ZSU-23/4 mobile antiaircraft gun cannot be distinguished from a T-72 tank. All you can do is make visual identification as you approach, perhaps using the Gun Camera to assist.

If you make identification too late for a successful attack on one pass, pull away and line up another. Try to spot the antiaircraft targets and their relation to other targets so that you can tell which is which on the radar from how they are arranged. Then you can line up the approach to the target you want with enough time to get a good shot.

Live or Dead Targets

Ground radar cannot distinguish between targets that have been destroyed and those that are still active. This makes it very difficult when you are attacking a group of targets and have already knocked out several. It is important to line up strafing runs while still far away for the best chance at a good shot. But at the range necessary for getting lined up, targets cannot be visually identified.

Build a mental image of the group of targets, attempting to remember which is where. If you keep making your attacks from only two sides of the group, it may be easier to build that mental map of targets and cut down on passes during which you can't get off a good shot.

Sometimes you may be able to use information from the Threat Warning Indicator to help identify radar-emitting targets. For example, at Robert's Pass in the training world, a mountain base is defended by ZSU-23/4s in close and SAM launchers around the perimeter. Knowing this, you can be sure that individual targets on the perimeter, away from the group, are the SA-2s showing up on the threat indicator.

Gun Camera

The Gun Camera multifunction display(MFD) can be called up by pressing the **[F8]** key. It shows the view from the nose of the F-16, and is potentially useful for spotting targets to your front and for identifying them.

Targets at long range first appear visually as black dots. When ground clutter to your front is thick, sometimes you can spot a black dot in the Gun Camera easier than you can through the windscreen, especially with most of the HUD being somewhat cluttered already. If the target can be selected, it appears in the distance as a bright glint of light.

The Gun Camera switches to the Target View when the target seen in the camera is within 15,000 feet, or 2.5 nautical miles. This switch to the Target View occurs before you can see much detail through the windscreen. In this case the Gun Camera can be useful for identifying what the target is, and whether it has been destroyed already or not. Figure 10-4 shows a ground target seen in the Target View from the Gun Camera.

However, in most ground attack situations, you cannot afford to have both the ground radar and Gun Camera MFDs up at the



Figure 10-4
Target View of a
ground target in
the Gun Camera

same time, because the left-hand display covers the Missile Warning Lights. Turning off the radar to turn on the Gun Camera, making the identification, and then turning the camera off to turn the radar back on, is probably not worth the trouble.

For these reasons, most players find the Gun Camera of minimal use when strafing. If you do use it, consider turning off the Terrain Within Gun Camera option to simplify the picture produced by the camera and make distant targets easier to spot. This option is discussed in Chapter 6.

The Gun Camera itself is also discussed in Chapter 5.

External Camera

The External Camera view can be useful for spotting and identifying ground targets. This is best used when you are not under fire or doing other dangerous flying. Good times to use this camera are when you are far out, approaching the target area, or after flying over. Press the **[Ctrl] + [F6]** keys to open the External Camera view of ground targets.

The camera view centers on the nearest target. By continuing to press the **[Ctrl] + [F6]** keys you can cycle through all nearby ground targets. From this view you can see individual targets more clearly. This is perhaps the best view from which to determine whether a target is still alive or destroyed. During a lull in the battle, use this camera to look over all targets to get a better idea of their relative location and condition. Use this information to plan upcoming ground attack passes.

The major problem with the External Camera is that you are flying blind and cannot see the HUD. This is why the camera is of limited use during action.

Visual Contact

Once the Threat Warning Indicator and ground radar have helped you find ground targets and you are headed for them, most spotting and identification for strafing is done visually through the windscreen. This is due to the use of the Strafe Reticle for aiming, the lack of other suitable ways to identify ground targets, the inability to designate targets when strafing with rockets, and the importance of lining up a strafing run at the target.

Spotting Targets

When strafing with the cannon, targets can be designated when they are within radar range. This can be done manually by pressing the **[T]** key, or automatically if you have the game option Auto-Targeting turned on. In either case, if the target is in the

distance to the front of the windscreen, it appears as a glint of light. As you get closer, the object becomes more defined, until at very close range it appears as a detailed three-dimensional shape. The glint of light becomes a small white cross that remains on the target, even in a close-up view.

When strafing with rockets, a target cannot be designated. A target in front of the windscreen appears first as a black dot. Look for black dots at all times during ground attacks. A dot is your first clue to a target's location and your first guide for lining up a strafing run. As you approach the dot, it winks out and is replaced by the beginnings of its three-dimensional shape. At first, the three-dimensional shape may be much harder to see than the dot, but gradually the object comes into view.

Note that a more detailed Target View of an object is visible in the Gun Camera when you get within 15,000 feet of it. This is not true when making a visual identification through the windscreen. The point at which a target switches to a more detailed Target View differs with each object. The switch point is related to how complicated the object is. So, don't assume that a target that just became more detailed is 15,000 feet away.

Visual Identification

There are several problems when attempting visual identification of targets. First, targets remain very small and lacking in detail until relatively close. This means that you can be lining up a shot at the wrong target and not have much time to switch targets when you realize your mistake.

Second, targets that have been destroyed are hard to distinguish from ones that are still active. There is no easy answer to this. With experience you may learn to keep track of what has been hit and where it is located in relation to other nearby targets.

Third, targets that have been shot at and missed may be surrounded by craters. At long distance, it can be hard to distinguish the target among several craters when using rockets. With the cannon activated the target can be designated, by which it is marked with a small, bright target cross at long range, distinguishing it from the piles of earth thrown up. Also, most targets are going to be colored black at long range, and the craters are more brown. A discerning eye may be able to pick out the black from the brown.

In some cases, targets can be hard to see because of the terrain they occupy. For example, fly a strafing search-and-destroy mission to Steeds Zone in the training world. As you come in low and slow at the vehicles on the ground, notice how hard they are to distinguish from the dark greens of the ground.

When ground targets are hard to see or difficult to approach, try coming at them from a different aspect. The change in background may make targets easier to spot, or the terrain may be less of a hindrance to a low approach.

Strafing Attacks

The most commonly followed steps taken to line up strafing attacks are as follows. Adhere to the mission briefing plan and fly to the waypoints as instructed. When ground targets are expected at a waypoint, approach the location on your own, without the aid of the autopilot. As the waypoint nears, watch the Threat Warning Indicator and ground radar for the first signs of targets on the ground. Once you have located targets electronically, use the radar screen to determine a heading to take toward them and then watch through the windscreen for visual contact. Once in visual contact, adjust the F-16's approach for strafing.

Strafing Approach

Place the HUD in near zoom and activate the correct weapon.

Turn on the Victim Camera, but be sure to turn off the Weapon Camera when using rockets. The Victim Camera only shows targets that have been destroyed. This can be critical information if you are planning several passes at a group of targets. If you can remember the approximate location of a target whose destruction you witnessed in the Victim Camera, you can avoid wasting time lining up on it again.

Use the ground radar to find a heading by which to approach the target. Look through the windscreen for the black dot indicating its location and immediately line up the dot with the Strafe Reticle once it is spotted. Make any needed turns as quickly and smoothly as you can and use the rudder for fine adjustments.

Come in at a low altitude, under 500 feet or lower. Keep your eye on the Altitude Above Terrain readout and don't get too close to the ground. Watch for hills that may require a little extra altitude to cross over. Airspeed should be below 400 knots. Keep the F-16 flying level as you approach. If you must dive slightly to bring the Strafe Reticle onto the target, do so just before shooting and wait a second for the plane to steady. Figure 10-5 shows an F-16 during the approach to a strafing attack.

One way to minimize the turning necessary for subsequent approaches on a group of targets is to cross back and forth. As you pass over, continue on straight past the group for 5 nautical miles or so and then perform an Immelman turn maneuver. This turns you around 180 degrees and heads you back directly for



Figure 10-5

Approaching for a strafing attack

the targets. The Immelman turn gains some altitude that you must lose as you head back. Once the group is reacquired on ground radar, select a new target and adjust the heading somewhat to line up on it.

Continue crossing back and forth over the group, using Immelman turns to reverse your direction. This gets you turned around and headed in the right direction faster than more time-consuming banking turns.

This crisscross strafing attack works in *Strike Commander* but is a poor tactic for real-world attacks. In reality, antiaircraft guns are never all taken out and this type of maneuver would make you an easy target.

General Strafing Tactics

Specific issues related to using either the cannon or rockets in strafing attacks are discussed below. General strafing tactics concern lining up strafing shots and how to attack a group of targets.

Strafing Shots

Remember that the Velocity Vector Indicator must be steady when you shoot. If the indicator is steady and the Strafe Reticle is on the target, shoot when within range. When using rockets, you'll have to judge the range as there are no electronic aids to help you.

Fire off several bursts or salvos at the target. Take your finger off the trigger if the Victim Camera turns on. The fact that this camera has turned on at all tells you that the target is destroyed. Figure 10-6 shows the Victim Camera view of a ground target being destroyed.



Figure 10-6
Victim Camera
view of target
being destroyed

If you miss an anti-aircraft gun, be prepared to be hit as you pass over. The chances of being hit are very high if you fly over guns slowly and at low altitude.

When it is clear you are going to miss, punch up the afterburner and break left or right to make yourself a harder target to hit. Don't climb, especially if there are SAMs in the area. They may pick you up and fire missiles at you. Turn away, use the radar to line up again, and come back for another try.

Anti-aircraft Defenses

When attacking a group of targets, identify any anti-aircraft defenses present and knock them out quickly. Once they are gone, you can attack the rest at your leisure.

Anti-aircraft defenses can be either guns or missiles. They can be fixed in emplacements, mounted on vehicles, or mounted on ships. Table 10-1 lists the various anti-aircraft platforms and their ammunition limits. It is possible for some platforms to expend their munitions entirely. In that case they are no longer a threat and can be ignored. The most likely platform to do this is the fixed SAM launcher, which carries only four missiles. Gun platforms rarely run out of ammunition.

Anti-aircraft guns and missiles each present their own problems. Guns have a relatively short range, but are deadly when you fly over them at a low altitude. Guns are less effective when you are flying fast or high above them. Their range limits the altitude at which they can fire. Missiles are most often a threat when you are flying at medium or high altitude.

Table 10-1 Antiaircraft Weapon Ammunition Limits

Platform	Weapon	Ammunition Limit	Effective Range
ZSU-23/4	23mm gun	2,500 rounds	1,500 meters
Antiaircraft Gun	40mm gun	3,000 rounds	1,500 meters
Mobile SAM	SA-6 missile	12	6,000 meters
Fixed SAM	SA-2 missile	4	6,000 meters
PT boat	40mm gun	1,000 rounds	1,500 meters
Destroyer	SA-6 missile	12	6,000 meters
Carrier	40mm gun	3,000 rounds	1,500 meters

When both missiles and guns are present, they support each other. The guns protect against low-altitude attacks and provide close-in defense. Missiles defend against high-altitude attacks and provide a longer range defense. If you are planning to strafe, it is generally best to take out the guns first and then the missiles. While you work over the gun defenses, keep an eye on the Missile Warning Lights and be prepared to evade SAMs.

Strafing with Rockets

Rockets are a popular strafing weapon among the Wildcats because they are cheap, effective, and have a limited standoff capability. However, they are not easy to use.

Firing Rockets

Rockets are fired in salvos. When fired, one rocket is simultaneously launched from every pod being carried. For example, if you are carrying two pods, firing rockets launches two rockets. If you are carrying eight pods, then firing rockets launches eight rockets.

You may launch salvos one after another, up to the limit of five salvos. This limit is determined by the program and may be less than five under certain conditions. At the maximum, you can fire 40 rockets in quick succession at a target. If they all hit, that is enough firepower to take out any target except an aircraft carrier, or a runway (rockets don't have any effect on runways).

If you plan to fire rockets in successive salvos, be sure to turn off the Weapon Camera, as suggested above. With this off, you can fire salvo after salvo without interference, up to the limit the program allows.

Rocket Range

Rockets have an effective range of 3,000 meters. When rockets are activated, the Strafe Reticle shows where the rockets will hit at that range. Unfortunately, the HUD provides no information about the range to the target as you approach to shoot. With experience, you'll learn to judge when you can shoot rockets. The Gun Camera may be of some use in this regard, as the picture of a target in this camera turns into the detailed Target View when the F-16 approached within 15,000 feet of the target. However, you still have to judge when you have closed to 9,000 feet, at which point you can shoot.

Because the commonly encountered 40mm antiaircraft gun has a range of 1,500 meters, there is an opportunity to approach these guns, fire at them, and turn away before getting within their 1,500 meter firing range. If you can do this successfully, rockets are an alternative to using a safer but more expensive smart bomb against the weapon. Rockets are a more attractive alternative to cannon strafing because the cannon must be inside the antiaircraft gun range to shoot.

Rocket Hits

A rocket impact is marked by a fireball and explosion, whether it hits the target or the ground around the target. When several rockets hit at once, followed by more salvos, the target area is quickly masked by explosions. When rockets hit around a target like this, it is impossible to determine visually if the target has been destroyed. For this reason, keep the Victim Camera turned on when strafing with rockets. If the target is destroyed, the Victim Camera records the event so you know the attack was successful.

Rocket Damage

Rockets must hit to cause damage. Hitting nearby doesn't count. Each rocket causes damage equivalent to approximately one-twelfth of an Mk82 500 pound bomb.

One rocket hit is enough to destroy any vehicle except the ZSU-23/4 mobile antiaircraft gun, the BMP-2 armored personnel carrier, the M1 Abrams tank and the T-72 tank. However, two rocket hits destroy even these targets. Because rockets are fired in a minimum salvo of two, these targets are usually knocked out when hit. Rockets can also take out stationary antiaircraft guns and missile launchers.

It takes many more rocket hits to accumulate enough damage to destroy larger targets, especially ships. Theoretically, eight full

Pods of rockets are enough to destroy an aircraft carrier, but almost all must hit.

Rocket Ammunition Limits

The F-16 can carry either 2, 4, 6, or 8 pods, totaling 38, 76, 114, or 152 rockets, respectively. The F-16 can carry a maximum of eight pods, two on each of the heavy and medium hardpoints.

The number of rockets left on board is shown in the Weapons Remaining readout at the bottom left of the HUD. Remember that each time you fire rockets, one rocket is launched from each pod. So, regardless of how many rockets you have on board the F-16, you can only fire rockets a maximum of 19 times.

The Unlimited Ammo option applies only to rockets during training missions. During *Strike Commander* missions, you can fire only as many rockets as you load.

Remember, as noted earlier, if you return from a mission with a rocket pod partially full, then regardless of how many are left, the pod is refilled and put back in inventory at no cost to the Wildcat Squadron. If you have one salvo of rockets left, don't shoot them off unless you have a good reason to do so.

Aiming Rockets

Rockets are aimed by placing the Strafe Reticle on the target and holding the aircraft steady. Fly level if you can, or in a very shallow dive if necessary. As the rockets come within range, to your best guess, launch one or more salvos. To make up for the inaccuracy of rockets, "walk" several salvos right through the target area. If the aim is accurate and the plane steady, hits are very likely. Figure 10-7 shows a target area where several rocket salvos have walked over the target, unfortunately missing in this case.

Rocket Tactics

Rocket tactics maximize your chances of scoring hits while simultaneously minimizing the danger to the F-16. The important steps include bringing the HUD's Strafe Reticle to bear on the target and correctly guessing when you are within range to fire.

Rocket strafing attacks are more difficult because the target of the attack cannot be designated. One tactic that helps compensate for this limitation is suggested below.

Rocket Strafing Procedures

First, line up the target of a rocket attack with the air-to-ground radar by turning so that you are headed directly for it. Approach

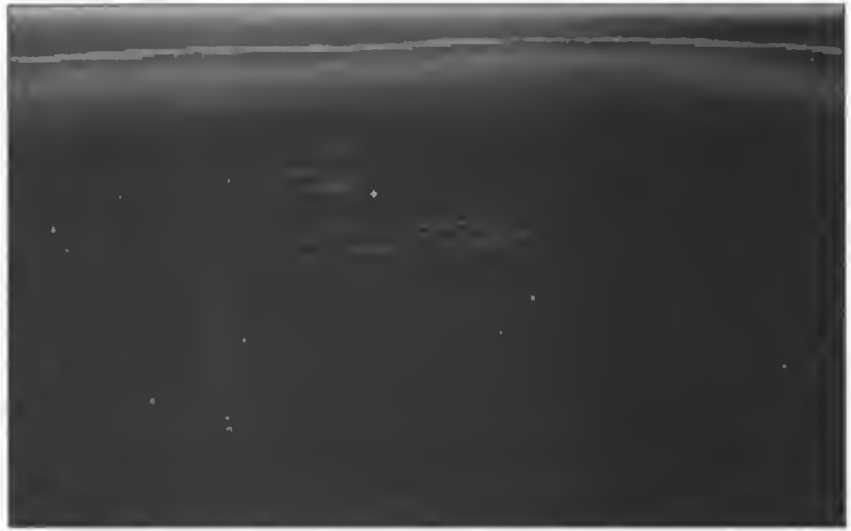


Figure 10-7

Result of walking
rockets into a
target

at an altitude of 500 feet or lower, and at a speed of 300 knots or slower. The lower you are the less of a dive pitch you may need in order to shoot. The slower you approach, the more time you have to make heading adjustments and the more salvos you can fire.

Watch through the windscreen for the black dot that marks the target on the ground. Turn quickly if necessary, using the rudder, to center the black dot within the Strafe Reticle. Keep the dot there and wait for it to go out and be replaced by a polygon shape. Unfortunately, this switch takes place at different ranges for each target type, and is difficult to see in any case.

When you reach a range of 3,000 meters (1.5 nautical miles), to your best guess, fire one or more salvos at the target in succession. Don't economize on ammunition at this point if you are attacking antiaircraft guns. You can be more conservative later when shooting at targets that can't fire back. There are no easy shots to take anywhere until the antiaircraft defenses are down.

If the target is an antiaircraft gun, turn away after the salvos have been fired and don't fly near the gun, or over it, which is extremely dangerous. Assuming that the rockets already on the way are going to hit can be a costly mistake.

The best rocket strafing runs are low, slow, and steady, with the Strafe Reticle right on the target. Visibility is bad as you approach because the target is small, terrain may hide it somewhat, and the Strafe Reticle and Velocity Vector Indicator may partially obstruct your view.

Using the Cannon to Set Up Rocket Attacks

A major limitation when strafing with rockets is that you cannot designate a target. This means the bright cross of light that appears in the distance to mark the location of the designated target doesn't appear, and, more importantly, the Range-to-Target readout doesn't appear on the HUD. Without this readout, there is no way to know accurately when you are within rocket range. There is no In Range message for rockets.

With a little work, you can compensate for this limitation somewhat. Do this by activating the cannon, instead of the rocket, in Strafe Weapon mode as you approach and line up the target. With the cannon activated, you can designate the target. This places the glint of light on the target at long distance, helping you locate it. This also places the Range-to-Target readout on the HUD.

Go through the normal steps of lining up the target with the gun activated and keep track of the closing range with the Range to Closure readout. When the range falls below 2.0 nautical miles, press the **[W]** key to switch Weapon mode to the rockets. If you are approaching low, slow, and steady, the Strafe Reticle should stay on the target. By the time you have made the switch in weapons you are probably within 1.5 nautical miles, inside rocket range, and can begin firing.

There are two possible problems with this tactic. First, switching weapons changes the calculations of the F-16's computer and may change slightly the location of the Strafe Reticle on the HUD. The reticle is now indicating the impact point at 3,000 meters, not 1,000. You may have to adjust your flying approach somewhat to get the sight back on the target.

Second, when the weapon switch is made, the bright cross of light marking the target goes out as well. If adjustments must be made to get the target back within the Strafe Reticle, it may now be hard to see the target because of HUD and ground interference.

Strafing with the Vulcan Cannon

The Vulcan cannon is the Wildcat's distant second choice for a strafing weapon, because using it in this role is difficult and often dangerous.

Strafing with the cannon is difficult because the range of the gun is short and the window of opportunity for shooting is very small. In addition, cannon shells don't do nearly the damage of rockets, although a large number of them can add up to substantial damage.

Strafing antiaircraft guns with the cannon is especially dangerous because the guns on the ground have a longer range than the Vulcan. They can be shooting at you before you can begin firing. You may be damaged or shot down before getting off your first shot.

In favor of cannon strafing is the fact that ammunition is free. There is no more cost-effective weapon at your disposal. Also, with the cannon activated for strafing, you can designate targets, making them easier to find. This also means important information about target range is provided on the HUD.

The cannon can destroy small targets, but larger ones, especially ships, are beyond its firepower. Using the Vulcan on a larger target may be justified if you have used up all other weapons and you know that the target is partially damaged. Several strafing attacks could add to the already accumulated damage and destroy the target.

Firing the Vulcan Cannon

When the Vulcan cannon is activated in Strafe Weapon mode, as noted by the Selected Weapon readout **VULCAN**, the gun is fired by pressing Fire button 1 or the spacebar. You can press and release to fire a short burst, or press and hold to fire a long stream of shells. A long stream is practical only if you are playing with the option Unlimited Ammo turned on.

The cannon fires approximately 100 shells per second. As you carry only 1,000 rounds on each mission, in a few seconds you can use up a lot of ammunition. When strafing, small bursts of shells are normally best because they “walk” through the target’s area, improving the chances of scoring hits.

Cannon Range

The Vulcan cannon has an effective range of 1,000 meters, which is shorter than any other weapon in *Strike Commander*. When the cannon is activated for strafing, the Strafe Reticle shows where the shells will hit at that range.

If you designate a target for the cannon, the HUD provides information about the target’s range as you approach to shoot. The Range to Closure readout continually updates how far you are from the target in nautical miles. You are within range to shoot when this readout falls to 0.5 nautical miles or less. In addition, the In Range message appears on the HUD when the cannon is within range.

Note that you must close within 3,000 feet of the target before you can even begin shooting—this is quite close. From that point you reach the target in 6 seconds (500 feet per second) when

your airspeed is 300 knots (300 nautical miles per hour). Assuming you need 2 or 3 seconds to pull up and avoid crashing into the ground, that leaves only 3 or 4 seconds to shoot once you are within range.

Cannon Hits

Cannon shell hits on a target are marked by small orange explosions. There is no explosion for a miss. If you see small orange fireballs, you are scoring hits.

As for rockets, the small explosions of shells may make it difficult to tell if the target has been destroyed as you fly past. Again, keep the Victim Camera turned on when strafing with the cannon. If the target is destroyed, the camera turns on and reports that the attack was successful.

Note that the game option Easy Gun Hits applies only to air-to-air combat, and not to strafing.

Cannon Damage

Like rockets, cannon shells must hit the target to cause damage. Near misses have no effect.

The program records a hit when a tracer collides with the target. Each tracer shell hit can cause approximately one-tenth the damage of a rocket, depending on how far the shell traveled before impact. The closer you are when you shoot, the greater any damage caused. The program then takes the damage caused by the tracer and multiplies it by five to add in the damage for the additional four shells between each tracer. The sum of all shell hits is the damage done to the target. If this total exceeds the damage resistance of the target, it is destroyed.

Maximum shell damage is caused if the target is within 1,000 feet when the cannon is fired. The shells are at their maximum velocity and they hit with maximum force. Unfortunately, at this range, you are only 2 seconds away from the target when flying at 300 knots. So, just when you can really do damage, you have to think about pulling away to avoid a crash.

A steady, single second of cannon shell hits is enough to destroy any vehicle, stationary anti-aircraft gun, or missile launcher. This may be enough to destroy other small targets such as small buildings. It is nearly impossible to take out larger targets, unless you can make a number of passes and get in close before firing.

Cannon Ammunition Limits

The Vulcan cannon is loaded for every mission with 1,000 rounds of ammunition. The number of shells remaining is shown in the

Weapons Remaining readout at the bottom left of the HUD.

The Unlimited Ammo option applies to the cannon in both training missions and *Strike Commander* missions. When this option is turned on, you never run out of cannon shells. However, this option carries a stiff scoring penalty, as discussed in Chapter 6.

Aiming the Cannon

The Vulcan cannon is aimed by placing the Strafe Reticle on the target and holding the aircraft steady. Fly level if you can, or in a very shallow dive if necessary. As the target comes within range, as noted by the In Range message or the Range-to-Target readout, begin shooting. Fire a short burst and watch the path of the tracers to see if they are heading to the target. Watch for the small explosions that tell you hits are being made. When you see explosions, hold down the trigger to fire a longer stream.

Despite the help of the Strafe Reticle, visibility may be such that aiming the gun is difficult. Firing a brief streams of shells allows you to watch their path and aim the shells by adjusting the F-16's flight path slightly and walking the shells right onto the target.

Cannon Tactics

Tactics for using the cannon to strafe targets are similar to those for strafing with rockets, with several important differences. Read the preceding section about making a rocket attack, and then modify that discussion with the additional information that follows.

Specific Procedures for Cannon Strafing

During the approach to the target for a strafing run, designate the specific target you wish to attack. This makes the target easier to find through the windscreen and to line up on for a pass. Also, having the target designated is critical for determining when you can shoot.

Flying as slowly as you can is even more important for cannon strafing runs because the slower you go, the longer the target is within shooting range. At the same time, of course, this gives the enemy more time to shoot at you. Watch either the In Range message or the Range-to-Target readout to determine when you can shoot. The range to target must be 0.5 nautical miles or less. Fire short bursts at the target and look for the tell-tale explosions marking hits.

Once you are within shooting range, count to yourself "one-thousand-one, one-thousand-two," and so on, for 3 or 4 seconds and then pull up to avoid a collision with the ground. Don't worry

about not destroying a target on one pass because it may take several for even a small target. Just remember it's hard to hit ground targets with cannon fire at long range, and when the range closes it is probably time to pull away.

Suitable Cannon Strafing Targets

The cannon is usually the wrong choice for attacking antiaircraft guns. The 40mm anti-aircraft gun has an effective range of 1,500 meters, 500 more than the 20mm Vulcan. If you approach such a gun at 300 knots, it can fire at you for 3 seconds before you can begin shooting. Three seconds can be a very long time. The 40mm shells are nearly twice as destructive as your shells, and even slight damage may destroy important weapons and landing gear.

If you don't destroy the gun on your first pass, it gets a good shot at you as you fly over. In addition, it can keep shooting at you as you head away. During a 300 knot strafing run at an anti-aircraft gun, it can shoot at you for 18 seconds while you shoot at it for 3 to 5 seconds. Those are not favorable odds.

Antiaircraft guns are more safely attacked with rockets, or with bombs from a higher altitude and at a higher speed, or, most safely of all, with smart weapons. Cannon strafing attacks against antiaircraft guns are only for the desperate.

A more suitable target for cannon strafing is a SAM launcher. It doesn't have the close range firepower of antiaircraft guns, yet is an important target. Taking it out with guns can save other ordnance for larger or more valuable targets.

Finally, the cannon may be the weapon of last resort when all other ordnance has been expended and some ground targets remain. This may be especially useful if you know a ground target has been partially damaged. A few cannon hits may be just enough to finish it off. However, don't risk strafing attacks for no real gain. If the mission goals are accomplished, head home. Strafing with the cannon is inherently risky. A slight miscalculation or distraction can pile you into the ground.

The *Strike Commander Technical Supplement* suggests that you always save 150 cannon rounds or so for the trip home. Air ambushes are a common occurrence for the Wildcats, and this is another reason not to waste cannon rounds on risky, yet meaningless, strafing attacks.

BOMBING ATTACKS



11

Many Wildcat missions involve attacking ground targets. Where strafing attacks are not appropriate, the next most common choice of weapon is a nonguided, or dumb, bomb. Nonguided bombs are called dumb bombs because they fall freely once dropped. You aim them with the F-16 and sights on the HUD. Bombs are more costly to use than rockets or the Vulcan cannon, but are more accurate and cause more damage.

The three nonguided bombs in the Wildcat arsenal are the Mk82 general purpose bomb, the Mk20 rockeye cluster bomb, and the Durandal runway cratering munition. All three have unique abilities and characteristics, making each particularly suitable for certain types of missions and targets. Mk82s and Mk20s are dropped in sticks, two bombs at a time, whereas the Durandals are dropped individually. These three bombs are also discussed in Chapter 7.

The Mk82 and Mk20 bombs can be activated in two different Weapon modes, CCIP (Continuously Computed Impact Point) or CCRP (Continuously Computed Release Point). Both modes place visual aids on the HUD to help aim bombs accurately. The choice of which mode to use in a bombing attack depends partly on the terrain you fly over when approaching the target, and partly on personal preferences. CCIP is simpler to understand and less sensitive, but CCRP is more accurate. The Durandal bomb is activated only in CCRP mode.

Wildcat pilots must bomb accurately. You can carry only a limited number of bombs, and that means you cannot afford too

many misses. A few inaccurate drops may result in a failed mission. Bombing targets are often too large to be finished off with a few strafing runs after your bombs are gone.

Bombing accurately also helps strengthen the financial condition of the Wildcats. Bombs are much cheaper than the smart weapons discussed in Chapter 12.

To follow the discussion about the two bombing modes, start a training search-and-destroy mission and load 24 Mk82 bombs. Remember, if you are playing with the option Unlimited Ammo, you need to load only two bombs in a training mission. Fly to Halverston in the training world and practice bombing there. Targets for bombing in the Halverston area include large buildings, fixed anti-aircraft guns, a mobile anti-aircraft gun, and a super tanker.

To practice bombing a runway, load either Mk82s or Durandals, or both, and fly to Wipeout Rock. There is an undefended runway there, plus a few support buildings.

Remember, from the Configuration menu (press **Alt** - **0** during play) you can restart a mission from its beginning (buttons Exit Game, then Restart), or start a new mission entirely (buttons Exit Game, then Abort).

CCIP Mode

The CCIP Weapon mode is the easiest of the two bombing modes to understand and, therefore, the one new pilots feel most comfortable with. The CCIP mode continuously reports on the HUD where the bombs will land if they are released immediately (remember CC stands for continuously computed, and IP stands for impact point). However, for this aiming aid to be used accurately, the F-16 must be flying properly and certain terrain conditions must apply.

How CCIP Mode Works

When you activate a bomb in CCIP mode, a new HUD feature appears. This is the CCIP aiming sight, shown in Figure 11-1. The sight consists of a circle with a dot in the center, and a line running from the dot to the Velocity Vector Indicator.

The dot in the center of the CCIP sight circle is the impact point. The *Strike Commander Technical Supplement* calls this the "death dot." The F-16's computer continuously calculates where bombs released immediately will impact on the ground and indicates that point with the dot in the CCIP sight. The computer considers the F-16's airspeed, its altitude, and its vector (line of movement through space), plus the aerodynamics of the bombs.



Figure 11-1
CCIP aiming sight
on the HUD

The line from the sight to the Velocity Vector Indicator is the “fall line,” showing how the bombs will fall.

If the F-16 is in a proper bombing run and the ground conditions are suitable, the CCIP sight accurately indicates where released bombs will hit. When the dot in the center of the CCIP sight is on the target you wish to hit, release the bombs. They should hit the target, as the CCIP sight indicates.

Bomb can miss if they’re released when the CCIP sight is not properly on the target. Misses are more likely when the plane is not flying a proper bombing run, or when ground conditions are not suitable for the CCIP sight.

CCIP Bombing Run

A proper CCIP bombing run is essential to an accurate bomb drop. If the F-16 is not lined up and flying correctly, the CCIP computer cannot accurately indicate where bombs are going to fall. The computer does the best it can, but its calculations must be off because the assumptions it is making about the F-16’s vector are wrong. Because the bomb’s velocity and direction come from the motion of the F-16, an unpredictable plane results in unpredictable bombs.

Under certain flying conditions, the CCIP sight may not be visible at all. In these cases, bombs obviously cannot be dropped accurately because you can only guess where they will hit. The F-16 must be flying in such a manner that the sight is visible on the HUD.

Locate the Target

A proper bombing run begins with locating the target. If you need help in locating a ground target and lining up an attack run against it, refer to Chapters 7, and 10, which discuss this subject. Lining up CCIP bombing runs is difficult because the target must be found and identified visually. Bombing targets, like rocket targets, cannot be selected, so you do not see the glint of light in the distance marking a target's location.

Larger targets are easier to bomb because they are easier to line up on. To see this, compare bombing the tower at the Wipeout Rock airfield versus bombing the hangar. The hangar is larger, making it easier to hit, and it can be seen earlier, making it easier to line up on.

Once the target is spotted, use banking turns to line up on it roughly, level out your roll, and use the rudder to line up on it exactly. The F-16 should have no roll for the bombing run, as indicated by both the Pitch Ladder and a directly perpendicular fall line on the CCIP sight.

When the bombing run is properly lined up, the fall line of the CCIP sight should be right over the target, partially obscuring it. As the bombing run continues, the sight circle should gradually move up to, onto, and past the target.

Altitude and Airspeed

The altitude and airspeed of the F-16 as it approaches a target determine how far bombs travel when released. Bombs derive their velocity from the F-16 prior to release. Your airspeed and altitude also help determine where the CCIP sight appears on the HUD. If you are flying too high or too slow, the impact point may be such that the sight is not visible on the HUD.

Once released, bombs fall freely to the ground, but they fall forward of the point at which they were released because of the velocity they acquired from the F-16. At the moment of release they are flying at the same speed as the plane, but their forward motion begins to decrease immediately because the source of thrust is no longer pushing them forward. As the thrust energy dissipates, their forward motion slows, while gravity continues to pull them to the ground.

The computer calculates all of this and the CCIP sight shows where the bombs will hit, based on their velocity (acquired from the F-16's airspeed) and how far they must fall (determined by the F-16's altitude). If the F-16's airspeed is relatively low, the bombs will have a low velocity and will fall more directly

downward. In this case the CCIP sight may be very close to the bottom of the HUD or even off it.

A proper bombing run comes in at sufficient altitude and air-speed so that the CCIP sight is clearly visible, yet at a speed that allows time to line up the approach accurately.

The F-16 should be not much lower than 500 feet, and not much higher than 2,000 feet. At 3,500 feet or higher, it becomes almost impossible to spot targets on the ground. If you are lower than 500 feet, flying is more dangerous and the target may be difficult to distinguish from ground clutter. Very experienced pilots are known to bomb at an altitude between 0 and 100 feet, right on the deck, but they risk being caught in their own bomb blast, in addition to the normal hazards of flying that low.

Against larger targets, bombing from higher altitudes adds the force of gravity to the impact of the bomb, increasing the damage caused by a hit. In reality, this force is negligible compared to the actual explosion. But in *Strike Commander* this force can double the damage caused by the bomb. Against small targets, this won't matter because the explosive force of the bomb alone is more than enough to destroy it. But it might mean the difference against a ship or other large target.



Flying above 4,000 feet on a bombing run against antiaircraft guns puts you out of range of the guns until you are directly overhead. However, you must approach at very high speed and it is more difficult to line up properly.

Airspeed should be below 600 knots, but the necessary speed is related to your altitude and is learned with practice. If you go too slow, the CCIP sight is not visible on the HUD. If you approach too fast, it is hard to line up on the target and release a bomb accurately.

If you can't see the CCIP sight as you approach a target, you may be flying too slow for your altitude. Punch up the throttle setting a few notches. Increased speed may bring the sight into view. A slight dive may bring the CCIP sight into view also. In addition, a slight dive increases your airspeed, which also helps bring the sight into view.

Bombing Pitch

A level bombing run is not mandatory and it may be hard to see the bombing sight without at least a slight dive. Remember that diving also increases airspeed, so the combined effect of increasing speed and losing altitude may make an accurate drop difficult.

Keep the dive steady. The Pitch Ladder on the HUD should be stable and not revolving up or down. The computer can aim accurately if the pitch is steady.

Aiming in CCIP Mode

Once the fall line is directly over the target, the bombing run should bring the CCIP circle right up to and over it, providing an accurate aiming point. However, the terrain below may cause errors in the computer's calculations.

When to Drop

Assuming that the bombing run is steady, the CCIP sight fall line is directly on the target, and the CCIP sight circle is in view, drop the bombs when the dot within the circle touches the target.

You may drop several sticks of bombs on the same target when using CCIP mode. First, be sure that the Weapon Camera is off. Then, as the CCIP sight approaches very closely to the sight, trigger one stick of bombs. As the sight moves onto the target, trigger another stick. Several sticks in succession should guarantee a hit. Try this in practice first to see if it is something you may want to use. The program pauses before dropping the next stick and this pause may be too long for accurate bombing.

CCIP Limitations

The major limitation of the CCIP sight is that it does not take into account any difference between the elevation of the ground below the F-16 and the elevation of the target. The altitude of the F-16 is being used to calculate both its altitude and the flight path of the bombs. The sight is assuming that the bombs are to hit at the same elevation as the ground currently below. If the target is not at the same elevation as the ground below the plane, the sight will be off, leading to inaccurate bombing.

When you place the CCIP sight on an elevated target, the computer is actually aiming at a spot behind the target and below it. If you release the bombs in this case they may miss altogether. If by chance the elevation is just enough to be in the path to the spot behind the target, a hit is possible.

The inaccuracy of the CCIP is more pronounced as the difference in elevation grows. With experience, you may learn to compensate by eye. If the target is on a slight rise, release the bombs slightly before the circle is on the target. If the target is in a depression, release slightly after the circle is on the target.

For more accurate bombing in variable terrain, the F-16 has an alternative sighting mode called CCRP (see page 223).

Dive Bombing

It is possible to dive bomb using the CCIP sight, at a very steep angle, although top *Strike Commander* pilots rarely use it. The advantage of dive bombing is that it can be done from high altitude, perhaps beyond the range of enemy anti-aircraft guns. From a high enough dive, you can release your bombs and pull out without drawing any fire.

Dive bombing can be done at any altitude. Starting at a high altitude, say 10,000 feet, allows you to avoid anti-aircraft gunfire for most of the attack. Start a steep dive with a low airspeed, because the longer you dive the greater the speed you pick up. As your speed increases, it becomes harder to pull out of the dive.

Once you are into the dive, adjust the flight path of the F-16 so that the CCIP sight is on the target. When the sight is on the target and the F-16 has been diving steadily with no pitch or roll adjustments for a second or two, release the bombs and pull out of the dive.

A major difficulty with dive bombing is that ground targets are difficult to see above 3,500 feet. You may have to dive on a target while using your ground radar as a guide. Once you have picked up the target visually, quickly adjust your dive to put the sight on the target.

Dive bombing is also expensive in terms of the time and energy required to make additional passes. From more level bombing runs, two successive Immelman turns can get you back quickly for another attack.

Another problem with dive bombing concerns anti-aircraft gunfire. When you are diving on a gun, it is much easier for the gun to calculate where you are heading and then lead your F-16. If you attempt to dive bomb an anti-aircraft gun and enter its range, there is a very high probability that you will get hit.

CCRP Mode

The CCRP mode for bombing is more difficult to understand than the CCIP mode, but once mastered it is often the preferred choice in all bombing attacks. Remember that CC still stands for continuously computed, but RP stands for release point. Terrain is no longer a consideration, but a proper bombing run is just as important.

The CCRP mode is the best choice in rolling terrain. If you see ridges or canyons below, using CCRP is the most accurate way to aim.

How CCRP Mode Works

For CCRP mode, a unique bombing sight appears on the HUD, as shown in Figure 11-2. This sight consists of a double circle with a dot in the center, and the familiar fall line extending back to the Velocity Vector Indicator. The double circle is intended to distinguish this sight from the CCIP sight.

The center of the CCRP sight is still an aiming point. However, the F-16's computer is now continuously calculating the moment when the bombs should be released so that they will fall and hit the point indicated by the sight. The computer uses radar to designate the spot indicated by the sight, and then considers the F-16's airspeed, altitude, and vector, plus the aerodynamics of the bombs, to determine when the bombs are released.

Once you have selected a target point by pressing the fire button, the computer holds the bombs aboard until the F-16 reaches the proper release point. The fall line of the CCRP sight changes slightly to display two small hash marks. One hash mark descends from the Velocity Vector Indicator and one rises from the CCRP sight. When the two hash marks meet, the bombs are released and they should fall to the target.

CCRP bombing is accurate in all types of terrain because the radar designation of the target point measures the height of the target. This height is added into the computer's calculations when determining the proper moment to release the bombs. You can see this as you fly over rolling terrain with the CCRP sight in



Figure 11-2
CCRP aiming sight
on the HUD

view. Keep the sight in view and the F-16 flying steady. You can see the sight rise and fall as it passes over elevations below.

CCRP requires a proper bombing run, similar to that necessary for CCIP bombing. In addition, CCRP bombing requires a relatively steady flight path after the bombs are triggered so that the radar can maintain a lock on the target point and release the bombs correctly.

CCRP Bombing Run

The bombing run for a CCRP drop is the same as that for a CCIP drop. You approach at a speed and altitude that keeps the CCRP sight on the HUD and allows you to pick up the target visually. The approach should be straight on with no roll. A shallow dive usually works very well, and helps to keep the sight in view. Line up the fall line of the sight on the target and wait for the aiming circle to pass over the target.

In general, the CCRP sighting is more sensitive than CCIP mode. This means that the bombing run must be as steady as possible.

Aiming in CCRP Mode

Once the CCRP aiming circle is centered on the target, press Fire button 1 to trigger the bombs. Note that this doesn't release them immediately. By triggering the bombs you are telling the computer that you want them to hit the point marked by the sight at the moment you pushed the Fire button. Now the computer takes over and waits to release the bombs until it calculates that they will hit as instructed.

CCRP Bomb Release

For the computer to release the bombs for the delayed CCRP drop accurately, the F-16 must fly relatively steady so the radar can maintain a lock on the aiming point and keep its calculations up to date. If the radar lock is broken for any reason, the drop is aborted and the bombs are not dropped. Figure 11-3 shows a CCRP sight after the bombs are triggered. Note the two hash marks coming together on the sight's fall line. When they meet, the computer releases the bombs.

You can generally hasten the moment of bomb release by pulling back slightly on the stick to give the F-16 a little lift. A slight lift changes the expected flight of the bombs and normally means that they are released earlier than they would be if the angle of approach remained unchanged from that at the moment



Figure 11-3

Hash marks on the fall line of a CCRP sight after bombs have been triggered

the bombs were triggered. However, too steep a climb may mean that radar lock is lost.

You may trigger only one stick of bombs at a time in CCRP Mode. Once the first stick has been released by the computer, another stick can be triggered if you can locate another target quickly.



In some versions of Strike Commander, the release point may actually occur when the program is between frames. If this happens, the bombs are not released, as if radar lock was blocked. This means that your bombing run is a failure, unfortunately, no matter how good your shot. At least your bombs are not lost. The slower your system the more likely this is to occur. It is a problem for everyone, however, because on the fastest systems the game slows down to around 10 frames per second in a bombing situation because so many objects are being drawn in each frame.

An advantage of pulling back slightly for bomb release is that this can be a preliminary move to making an Immelman Turn if you wish to use that maneuver to turn around in preparation for another bombing run. The Immelman may also keep you away from anti-aircraft guns on the other side of the target.

Toss Bombing

Toss bombing is a CCRP-mode bombing tactic that can be useful when you wish to get in and out quickly. To toss bomb, approach in a shallow dive and then pull up slightly after the bombs are

triggered, as discussed above. The effect of pulling up is to “toss” the bombs slightly, increasing their range, and allowing you to pull away sooner than you might otherwise be able to do.

Toss bombing allows a lower approach. The aspect of your getaway also helps regain altitude for other maneuvers.

The Mk82 General Purpose Bomb

The Mk82 is the standard 500 pound bomb and one of the most commonly used ground attack weapons. It is cheap and powerful, and can be used against any ground target, even runways. Figure 11-4 shows an Mk82 bomb on its way toward a target.

Using the Mk82 Bomb

To use the Mk82 for precise bombing, CCRP mode is probably best. This provides the greatest accuracy. The blast radius of the Mk82 is reasonably large, but to achieve the maximum blast effect against the target, the bomb must hit as close as possible. Being off by as little as 50 yards may mean the difference between a target missed and one destroyed.

Expert *Strike Commander* pilots at ORIGIN Systems are known for using the CCRP sight and Mk82 bombs at very low altitude to methodically take out an entire group of targets, one pass at a time. A pair of these bombs can take out almost any target.

However, bombing in CCIP mode allows you to drop multiple sticks of bombs on the same target, which CCRP does not.

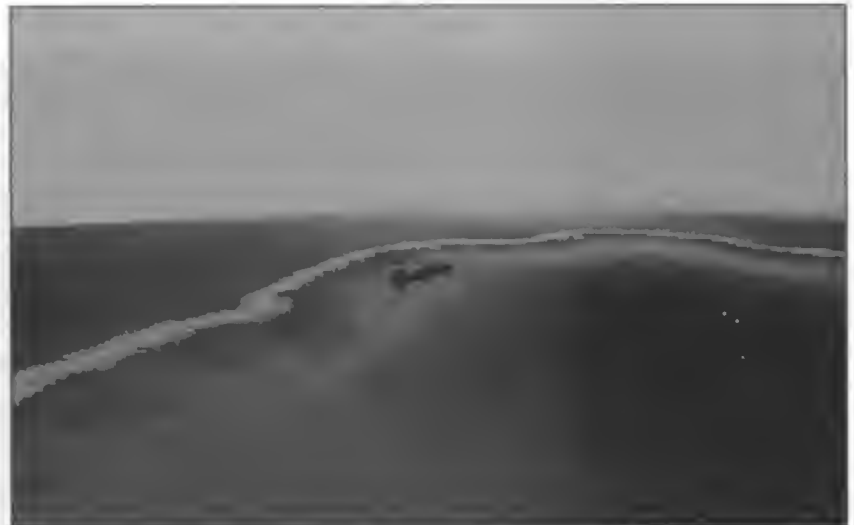


Figure 11-4
Mk82 bomb in flight

A single accurate bombing run over an aircraft carrier can take it out if a dozen Mk82s can be put on the ship at the same time.

Mk82 Targets

The Mk82 general purpose bomb is true to its name, as it can be used against any ground target you encounter. However, it is best used against larger targets that require substantial damage to knock out. Examples of large targets are bridges, ships, runways, and buildings.

These bombs can be used against smaller targets, such as vehicles and anti-aircraft platforms, but this is not efficient. Much cheaper weapons can destroy these targets just as easily. A pair of bombs hitting a vehicle may do 10 times the damage necessary to destroy it.

The Mk82 is a viable alternative to the Durandal for bombing runways. Three Mk82s can be purchased for the price of one Durandal and each does almost as much damage as the more sophisticated weapon. It takes eight direct Mk82 bomb hits to destroy a runway. Several partial hits can equal a direct hit.

The Mk20 Rockeye Cluster Bomb

The Mk20 Rockeye cluster bomb is the preferred choice when you wish to attack an area instead of a precise point, or for attacking several small targets simultaneously. The Mk20 causes a relatively small amount of damage, but this damage is spread evenly across its entire blast radius. The Mk20 is powerful enough to destroy

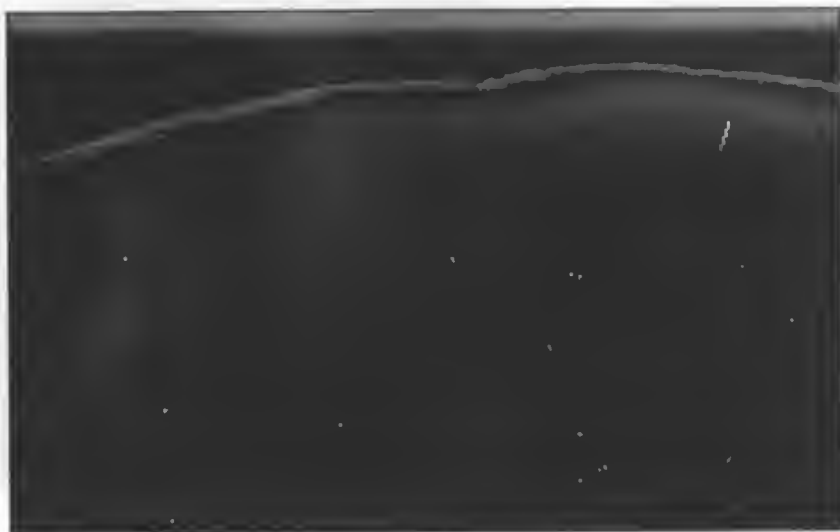


Figure 11-5

Mk20 bomb in flight
toward a target

any vehicle or anti-aircraft platform that it can cover with its blast radius. Figure 11-5 shows an Mk20 bomb in flight toward a target.

Using the Mk20

The Mk20 can be dropped in either CCRP or CCIP mode. The precision of CCRP is not critical because the cluster bomb is an area weapon. One general rule to follow when using the Mk20 is to aim short, rather than right on the target. The blast of the cluster bomb spreads forward from the point of detonation, causing most of its destruction in that direction. Aiming a little short offers the best chance of covering the target with the blast. Figure 11-6 shows the blast radius of one Mk20 bomb compared to some nearby Mk82 craters.

If small ground targets and vehicles are sufficiently close together, it is possible to hit more than one with a single stick of Mk20 bombs. In this case, aim slightly short of a middle point between two or more targets. The blast radius may cover several targets and destroy them all.

Multiple sticks of Mk20 cluster bombs may be dropped on the same pass. Experiment with this in a training mission before deciding if it might be useful on a real mission. Wildcat pilots are more useful to the squadron when they are precise. Indiscriminate use of multiple area weapons risks collateral damage to civilians and installations not meant to be hit. It is also considered a waste of munitions.

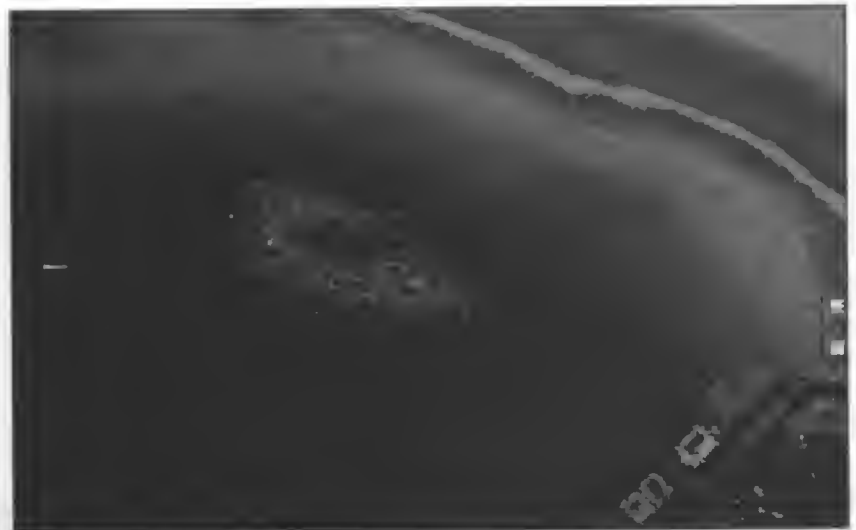


Figure 11-6

Aerial view of Mk20
blast radius com-
pared to nearby
Mk82 craters

Mk20 Targets

The Mk20 is a suitable weapon against any small target, including buildings, vehicles, and SAM launchers. It is preferable to the Mk82 against SAM batteries because its blast radius allows a larger margin for error and is more likely to destroy the target with one stick.

Antiaircraft guns are not good targets for Mk20s because of the danger of making such an attack, not because the weapon can't do the job. Cluster bombs can easily destroy antiaircraft guns but you can just as easily be damaged in return before the guns are knocked out.

The Mk20 is not a good choice against large targets or difficult ones that require a precise hit and a lot of damage. These include bunkers, bridges, and ships. The Mk20 has no effect against runways, so don't waste them against that target.

The Durandal Runway Cratering Munition

The Durandal runway bomb is a specialized munition designed to blast directly downward into a target and then detonate after penetration. It has a small blast radius but a heavy explosive charge. It was designed to heave up runways, rendering them useless for several days.

Because of its small blast radius and unique delivery system, the Durandal requires a precise drop. For this reason it is most commonly dropped in CCRP mode. Figure 11-7 shows a Durandal bomb deployed for firing.

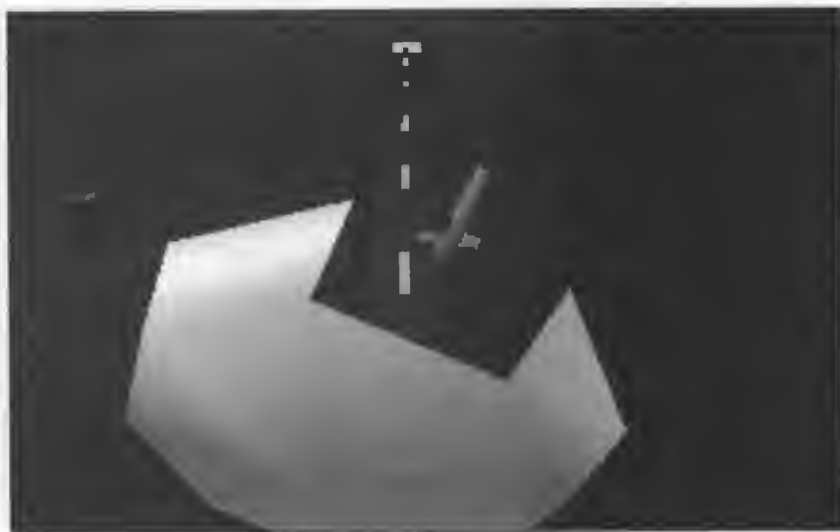


Figure 11-7

Durandal deployed
for firing

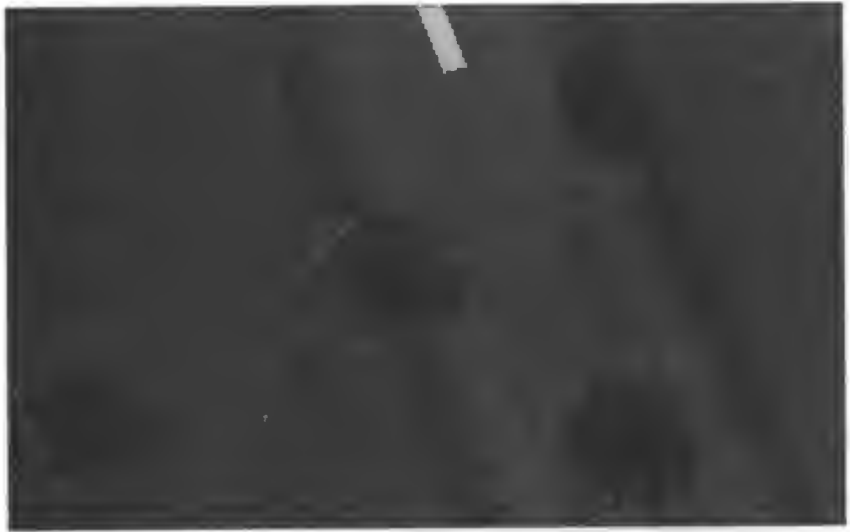


Figure 11-8

Durandal craters on
and around a
runway

Using the Durandal

The Durandal runway bomb is a specialized munition that has only a few other applications besides wrecking runways. It can be used to penetrate a heavily hardened target, such as reinforced aircraft shelters or bunkers. But small targets require a very precise drop to ensure that the Durandal goes off properly. In these cases, there are much more suitable weapons.

To aim the Durandal bomb precisely, take the time to make a good bombing run and drop accurately. If the run feels sloppy, pull off and try again.

In an emergency, the Durandal can be used against any target that takes substantial damage to destroy. However, there are cheaper alternatives to the Durandal for most uses, even runways.

Durandal Targets

The Durandal runway bomb is obviously a suitable weapon against runways. It can be used against other heavily fortified targets as well, such as bunkers. Figure 11-8 shows a runway after some hits and near misses by Durandal bombs.

It takes four direct Durandal hits to knock out a runway. Several partial hits may equal a direct hit.



1. The first part of the document is a list of names and addresses, followed by a list of names and addresses. The list of names and addresses is as follows:

Name	Address
John Doe	123 Main St, New York, NY 10001
Jane Smith	456 Elm St, New York, NY 10002
Bob Johnson	789 Oak St, New York, NY 10003
Alice Brown	101 Pine St, New York, NY 10004
Charlie White	202 Cedar St, New York, NY 10005
Diana Green	303 Birch St, New York, NY 10006
Frank Black	404 Spruce St, New York, NY 10007
Grace King	505 Willow St, New York, NY 10008
Henry Lee	606 Ash St, New York, NY 10009
Ivy Hill	707 Hickory St, New York, NY 10010
Jack Adams	808 Maple St, New York, NY 10011
Karen Baker	909 Poplar St, New York, NY 10012
Larry Clark	1010 Sycamore St, New York, NY 10013
Mary Evans	1111 Chestnut St, New York, NY 10014
Nathan Foster	1212 Walnut St, New York, NY 10015
Olivia Garcia	1313 Elm St, New York, NY 10016
Peter Hall	1414 Oak St, New York, NY 10017
Quinn Ives	1515 Pine St, New York, NY 10018
Rachel Jones	1616 Cedar St, New York, NY 10019
Samuel King	1717 Birch St, New York, NY 10020
Tina Lee	1818 Spruce St, New York, NY 10021
Ulysses Miller	1919 Willow St, New York, NY 10022
Victoria Nash	2020 Ash St, New York, NY 10023
Walter Owen	2121 Hickory St, New York, NY 10024
Xavier Perry	2222 Maple St, New York, NY 10025
Yvonne Quinn	2323 Poplar St, New York, NY 10026
Zoe Reed	2424 Sycamore St, New York, NY 10027



SMART WEAPONS



12

If cost were not a concern, the ground attack weapons of choice for all Wildcat pilots would be smart weapons. These munitions guide themselves once released, and fly directly into a selected target. Smart weapons are easy to use, highly precise, powerful, and relatively safe to use against defended targets.

The Wildcats have two smart weapons to choose from, depending on supplies and finances. The AGM-65D Maverick is a missile that flies into the selected target. The GBU-15(V)/B is a glide bomb that can guide itself enough to reach a target. Each of these smart weapons has unique characteristics that make one or the other more suitable for certain missions and targets.

Both smart weapons are activated in Infrared Weapon mode (I-R). They both use infrared imaging to find the selected target and lock onto it, and then guide themselves to the image. The Gun Camera multifunction display (MFD) is an important tool for effective use of both weapons.

There are a few problems with smart weapons. First, they are expensive, costing ten times as much as an Mk82 bomb. Second, the F-16 can carry only a limited number of smart weapons. If a mission requires the destruction of many targets, you may not be able to carry enough smart weapons to do the job, even if enough weapons were available.

For these reasons, smart weapons are not regularly used by the Wildcats. But when they are available and a good choice for a particular mission, it is important to know how to use them so

that every one used results in a hit. You want to make the most of their expensive technology.

The Maverick and the GBU-15 are also discussed in Chapter 7.

To follow the discussion about smart weapons, start a training search and destroy mission, and load six Mavericks and two GBU-15s. If you are playing with the option Unlimited Ammo, you need to load only two of each. Good targets for smart weapons can be found in several training world locations, including Halverston, Roberts Pass, Mayday Canyon, and Isaacs Bay. Use the Mavericks against antiaircraft guns, surface-to-air missiles (SAMs), and smaller ships, and the GBU-15s against larger targets, such as ships and large buildings.

Remember that from the Configuration menu (press **[Alt]** - **[O]** during play) you can easily restart a mission from its beginning (buttons Exit Game, then Restart), or start a new mission entirely (buttons Exit Game, then Abort).

I-R Weapon Mode

I-R Weapon mode is fairly simple to understand and use. New pilots can master it very quickly and be effective with smart weapons right from the start.

I-R stands for infrared imaging. The guidance system of the smart weapon uses a heat signature to identify the target and guides itself by that heat source while in flight.

To prepare for ground attacks with smart weapons, place the heads-up display (HUD) in close zoom. Then activate the smart weapon you wish to use by pressing the **[W]** key. If you plan to launch smart weapons one at a time, you may want to leave the Weapon Camera on. If you think you may launch several smart weapons on the same bombing run, turn off the Weapon Camera. To learn more about setting the Weapon Camera to turn on and off automatically, see Chapter 6.

A successful ground attack with a smart weapon requires finding and selecting a suitable target, a proper bombing run by the F-16, and a proper launch of the weapon.

How I-R Weapon Mode Works

When you activate either smart weapon in I-R Weapon mode, a small cross-hair appears on the HUD, as shown in Figure 12-1. The cross-hair appears on the HUD only in I-R Weapon mode. When the cross-hair is centered in the HUD, as it is in Figure 12-1, no target is currently selected for the smart weapon.



Figure 12-1

I-R Weapon mode
HUD, showing the
cross-hair

Once a target has been located and selected, the guidance system of the weapon searches for the selected target and locks on, if possible. When the weapon is able to lock on, the cross-hair moves from the middle of the HUD and centers on the target. If the target can be seen through the HUD, you can see the cross-hair move to it. If the target is not visible, then the cross-hair simply disappears from view. Figure 12-2 shows the cross-hair visible through the windscreen, but moved to the bottom right of the HUD onto a target.



Figure 12-2

I-R Weapon mode
cross-hair on a
target

The weapon's guidance system then continually tracks the target until either the lock is lost, a different weapon is activated, a new target is designated, or the weapon is launched. If the lock is lost, the cross-hair returns to the center of the HUD. If the weapon is launched, it flies or glides directly into the target unless the weapon's lock on the target is lost *en route*. If the weapon's lock on the target is lost *en route*, the weapon probably misses the target and hits elsewhere.

I-R Bombing Run

A proper bombing run for a smart weapon begins with locating the target and heading the F-16 toward it. Then the target must be selected and identified. Once a target is selected, the weapon's guidance system can search for it and lock on. Now the bombing run must bring the weapon within range of the target and to a proper position for launch. A launch from a good position means the weapon has a high probability of maintaining the lock and reaching the target.

Locating and Identifying the Target

The most useful tool for locating a ground target is your air-to-ground radar. Using this to find ground targets is discussed in Chapters 7 and 10. The Threat Warning Indicator can also help find ground targets that are using radar to search around them. Once you have ground targets on the ground radar, head your F-16 for them.

It is not necessary to line up exactly on a target to attack it with smart weapons. Just be headed in the general direction. When one or more ground objects appear on air-to-ground radar, press the **[T]** key to select the nearest one as a target. If the option Auto-Targeting is on, the nearest ground object is automatically selected as a target.

Once you are headed in the direction of ground objects, as indicated by your ground radar, turn off the radar and turn on your Gun Camera (press the **[F8]** key). (Remember, you don't want two MFDs up at the same time if there is a chance of SAMs or air-to-air missile attack.) The selected target appears in the Gun Camera with the I-R cross-hairs centered on it. At first, the target is an indistinguishable dot or shape in the Gun Camera view.

When the F-16 flies within 5,000 meters of the target, the picture in the Gun Camera switches to the detailed Target View, showing the object in close detail. At this point you need to determine what the object is, identify whether it is still active or

destroyed, and decide whether to attack it or switch to another target. Figure 12-3 shows the Target View of a 40mm antiaircraft gun as seen with the Gun Camera.

If the object in the Target View is not what you want to attack, or is already destroyed, switch targets by pressing the **T** key. Continually pressing this key cycles through all the ground targets your ground radar can see. When a suitable target is showing in the Gun Camera, stop pressing the **T** key. You are now ready for the final approach to launch.

Altitude and Airspeed

Smart weapon attacks are best made from around 2,000 feet. If you approach from much higher, it may be difficult to see the object you want to attack. If you come in at a lower altitude, you may not pick up the target fast enough to approach it properly and let the weapon lock on to it.

Airspeed should be as low as you can keep it. Below 500 knots is satisfactory. Flying slower than that gives you more time to identify the target, and to switch targets if necessary. The faster you come in, the less time you have to make identification and switch targets. If you don't have enough time, the weapon may not achieve lock, preventing you from attacking on this pass.

When there are antiaircraft defenses present on the ground, you may wish to come in a little faster to make it easier to pull away before being shot at or to come around for another pass.



Figure 12-3

Target View of an antiaircraft gun in the Gun Camera

Smart Weapon Release

The final approach to weapon release should be close to level and headed roughly toward the target. At the moment of release the weapon needs to have a good view of the target so that it can set up a proper flight solution and maintain the target lock during its flight.

Your F-16's computers keep track of the range to the selected target and the flight ability of the weapon activated. When the F-16 is within range of the target for weapon launch, the In Range message appears on the HUD. Smart weapons are released by pressing Fire button 1 or the **[Spacebar]**. Both weapon types are released one at a time.

Once the weapon is released you can turn away, but the turn should be a mild bank so that radar lock is maintained on the target. If the radar lock is lost, the smart weapon may lose its infrared lock on the target and miss.

Aiming in I-R Weapon Mode

Aiming in I-R Weapon mode is easy because it is all done for you electronically. If the target you wish to hit is selected, the weapon is locked on and ready for guided flight. Check the Gun Camera or make visual identification through the windscreen to make sure the target selected is the correct one. The target in the Gun Camera view is the one currently selected and the one the smart weapon is locked on. Terrain below the F-16 or occupied by the target is of no concern because the elevation of the object is considered by the weapon in its calculations.

When to Drop

Watch for the In Range message on the HUD. When it appears, the activated smart weapon is within effective range of the target, locked on, and ready for flight. If the F-16 is flying reasonably level and steady, and the target is in front of the F-16, launch the weapon. Under these conditions, the weapon has a high probability of scoring a hit.



It is possible for the target to remain selected and in view in the Gun Camera, even though you have flown past it. In the Infrared Weapon mode the Gun Camera is replaced by a camera that is part of the infrared guidance system, and one that can pan somewhat to keep a target in view. Do not launch a smart weapon when the target is behind you because it cannot turn around easily and fly back to the target. Expect to miss in this situation. Hits are most likely when the target is in front of the F-16.

Multiple Weapons

Smart weapons are launched one at a time, but it is possible to launch several in one pass. Multiple weapons can be launched at a single target or at different ones.

Once the first weapon has been fired, check to see if the target is still designated with the cross-hairs. If the target is still marked with the cross-hairs, still in range, still in front of you, and the F-16 is still in a good level position for firing, press the Fire button again to launch a second weapon at the same target. In this manner several weapons can be launched successively at the target.

If you wish to switch targets during the same pass, press the **[T]** key after the first weapon is launched. Look at the Gun Camera view to see the new target. If the new target is something you wish to attack, and if the other preconditions for a good launch still apply, press the Fire button to attack the second target. In this manner several targets may be attacked in one pass, so long as you have missiles to fire and targets can be selected.

I-R Weapon Mode Limitations

Smart weapons may miss when they're launched while the F-16 is in the middle of a maneuver and not flying steady. In this case, it may be difficult for the F-16 to maintain radar lock on the target, and for the weapon to maintain its lock. If either lock is broken, the weapon has a high probability of missing.

This can be a problem when trying to launch smart weapons while your F-16 is under missile attack itself. The sharp breaking turn necessary to avoid a SAM may cause your smart weapon to miss. In this case hold to a mild turn or steady flight for as long as you can to give the smart weapon the best chance to home in on its target. If the smart weapon can get close, it has a good chance of hitting.

The AGM-65D Maverick

The AGM-65D Maverick is a very popular smart weapon for several reasons. It is an air-to-ground missile (AGM) with substantial range and an excellent guidance system. It has a warhead that is approximately two-thirds as powerful as the Mk82 bomb, which means it can destroy most small and medium targets. Its range and accuracy make it an excellent standoff weapon, able to destroy targets while keeping the parent F-16 out of danger. Figure 12-4 shows a Maverick in flight toward a target.

Figure 12-4
Maverick
air-to-ground
missile in flight



Using the Maverick

The Maverick missile must strike its target to have any effect (near misses don't count), but its guidance system is very good and this is normally not a problem. The Maverick's 6,000 meter effective range and precision guidance suggest its tactical value as a standoff weapon.

As you approach the target, wait for the Gun Camera to change to the Target View. Remember that this occurs when the F-16 is within approximately 5,000 meters of the target, well within Maverick range. Once you identify the target and conclude that it is the one you want to attack, you can fire the Maverick effectively because you know you are within range.

Once the Maverick is launched, begin a slow turn away to bring yourself around for another pass.

Maverick Targets

The Maverick can destroy any medium to small target, but it is especially useful when its standoff capability is important. This is most often the case when antiaircraft ground defenses are strong. Use the Maverick to destroy antiaircraft guns and SAM launchers from long range. Used properly, enemy guns never get a good shot at you. Where guns and SAMs are both present, knock out the SAMs first because they have the longer range of the two, and can interfere with your Maverick runs.

Once the antiaircraft defenses are knocked out with Mavericks, mop up other ground targets with cheaper weapons.

Mavericks can also be useful against naval targets. One Maverick may be enough to take out a destroyer and two should destroy a PT boat. Knocking out these smaller ships can open the door to attacks on a carrier. Remember that launching smart weapons from higher altitudes reduces the risk of antiaircraft gunfire, but makes it easier for SAMs to target you.

Mavericks are also useful against small targets, for which a high degree of precision is required you may need to avoid hitting other objects close to a target, or you may want to make one high-probability run before clearing out of the area.

Mavericks have no effect against runways.

The GBU-15(V)/B Smart Bomb

The GBU-15 is the largest ground attack weapon in the Wildcat arsenal. It is a guided 2,000 pound bomb designed to take out the largest targets. It is so heavy that the F-16 can carry a maximum of four. The guidance system compensates for the limited number that can be carried, however—it practically guarantees you'll score a hit.

Using the GBU-15

The GBU-15 is designed to be precise. Use it in situations in which a large target is to be destroyed with the minimum of effort. It has a standoff capability, like the Maverick, and this reduces the risk of bombing heavily defended targets.

The GBU-15 is best dropped from as high as possible and under very steady flying conditions. This bomb glides to the target and is not self-propelled. A high, level bombing run at low speed provides the best chance for achieving and maintaining target lock once the bomb is released. Figure 12-5 shows a GBU-15 in flight toward a target.

For this reason, the GBU-15 is best used where the air defenses are minimal or already neutralized. Before dropping GBU-15s be sure to knock out any SAM defenses. The bombing run of this weapon leaves your F-16 especially exposed to missiles. You can fly above the antiaircraft guns to minimize their chance of hitting you.

Once any SAMs present are destroyed, take the time to make a slow, high approach from which to launch the GBU-15.

GBU-15 Targets

The GBU-15 is most suited for the largest targets, such as aircraft carriers, bridges, large buildings, and bunkers. It can damage a

Figure 12-5
GBU-15 smart
bomb in flight



runway, but in I-R Weapon mode the runway cannot be designated as a target (it has no heat signature to lock on). So the GBU-15 should not be aimed at the runway. Using the GBU-15 against smaller targets is normally a waste of money and overkill.

Dropping a single GBU-15 from 3,000 feet or so may cause enough damage to destroy any target you can encounter. The only exception to this is an aircraft carrier, which normally must be hit by two GBU-15s to be destroyed.

TAKING OFF AND LANDING



Learning to land isn't easy. This is a skill that often keeps students from becoming pilots. It is even more difficult to land a modern jet aircraft like the F-16. The designers of *Strike Commander* have made it easier for you, however, by including autopilot landings as a game option.

Before you can land an F-16, you have to get the plane into the air first. Taking off is considerably easier to master than landing. But again, the designers of *Strike Commander* have made taking off easier still by including optional autopilot takeoffs as well.

All training missions begin with the F-16 already in the air and you in the cockpit. All *Strike Commander* game missions, however, begin at a base from which you must take off. Then you must land the F-16 to complete a game mission and get credit for completing it. In contrast, training missions have no set ending. They end when you wish. There is no scoring involved in a training mission, so there is no incentive to land afterward.

If you are playing *Strike Commander* at a low level of challenge, primarily for the fun of flying the F-16 in combat, you can easily do without the additional skills needed to take off and land. If, instead, you wish to play with a higher level of challenge and experience more of what real pilots do each day, then learn how to take off and land. If you are trying to achieve as high a score as possible, you'll need these skills to earn extra points on each mission.

Practicing Takeoffs and Landings

Takeoffs and landings in *Strike Commander* require a certain amount of practice before they become relatively routine. This is especially true of landings. Before risking landings at the end of *Strike Commander* missions, practice a few in the training world first. A crash during landing wipes out all of the effort and success of the game mission, not to mention killing your character. (If you have saved your game before the mission you can try it again.)

Where to Practice

You can practice landing after any training mission by flying to the Strike Base and landing on the runway there. Once you land there, however, the mission is considered over and you don't have the opportunity to take off again.

The only way to practice taking off during a training mission is to land first at the Mayday Canyon runway and then take off. You can practice landing and taking off here continually. Before attempting to land here, though, be sure to destroy the anti-aircraft defenses nearby. Bring along some ground attack weapons to take out the surface-to-air missile (SAM) launcher and anti-aircraft guns.



There is a runway at Wipeout Rock in the training world, but it is under construction and not operating. If you attempt to land here you'll crash, because the program treats the runway as open ground. You cannot use the autopilot to land here either. If you trigger the autopilot over Wipeout Rock, you fly to your next waypoint instead of landing.

Practice Parameters

Landings are much easier when certain game options are turned on. The option Easy Landings relaxes the standards that determine when an F-16 crashes on the runway versus when it lands successfully. Switching off the Stalls and G Effects options makes it easier to approach the runway and bring the F-16 down. Activating the 360 Degree Radar option makes it easier to find the runway when you are near it, and easier to line up your approach.

All of these game options are discussed in Chapter 6. Turning on each of these options also incurs some penalty to your score for a *Strike Commander* mission, if that is a concern.

Before attempting to land, place the HUD in close zoom if it is not already in that position. The close-zoom HUD makes it

easier to watch the various readouts concerning airspeed and altitude as you come in for a landing. Turn on the ground radar multifunction display (MFD) to help line up the runway.

Taking Off

Each game mission begins with your F-16 on the ground, fueled, armed, and ready for takeoff. You can have the autopilot take you off or do it yourself.

Autopilot Takeoffs

When a game mission begins, a view of the Wildcat base opens and pans around the runway. As it pans, your wingman begins taxiing down the runway and taking off. At this point you can have autopilot takeoff by pressing the **[A]** key. Figure 13-1 shows a view of the Wildcat base and runway prior to takeoff.

The autopilot sets the throttle, releases the brake, and pulls back on the stick as the F-16 begins to lift. You watch all of this from the External Camera. After the autopilot retracts your landing gear, you are returned to the Close Cockpit view and resume control of the F-16.

That's all there is to it. When your wingman starts to take off, just press the **[A]** key and sit back to watch.

The drawbacks of an autopilot takeoff are that you lose some points from the mission, and you miss any sense of accomplishment for doing it yourself. The point penalty is not large, but



Figure 13-1

Wildcat base and
runway just prior to
takeoff

over the 20 or so missions of an entire game they add up. In addition, you don't have the opportunity to go through the pre-flight checklist and must check those items after you are in the air and the mission is underway.

PreFlight Checklist

Real pilots and their ground crews go through extensive procedures before taking off to assure that the aircraft is ready to go. Most of that work is already done by the time your mission actually starts. Nevertheless, you should check or set the following items before taking off.

Weapons Loadout

Press the **[W]** key to cycle through the weapons on board the F-16 to be certain that what you are carrying is what you intended to carry. If the loadout is not what you intended, call up the Configuration menu (press **[Alt]** - **[O]** keys), press the Exit Game button, and then press the Abort button. This starts the mission over from the beginning, allowing you to reload weapons.

Choosing a HUD Weapon Mode

Once you have checked the weapons loadout and it is satisfactory, continue pressing the **[W]** key until the weapon you want is activated. In most cases this is an air-to-air weapon, possibly a missile. If it is a missile, activate the one available that has the longest range (AIM-120 first, then AIM-9M, then AIM-9J). An air combat weapon is the normal choice because you are more likely to encounter enemies in the air before you need to prepare for ground attacks.

Selecting Camera Views

Open the Configuration menu (press the **[Alt]** - **[O]** keys) and then press the Cameras button. Decide which cameras are to turn on automatically, if any. You'll almost always want the Victim Camera set on. The Weapon Camera is fun to watch, but normally a luxury you cannot afford if you wish to survive. These camera options are discussed in Chapter 6.

Setting Game Options

Once the cameras are set, check other game options to see that they are set as you wish. Other game options are also discussed in Chapter 6.

When you are satisfied with the mix of game options, exit these menus and return to the Close Cockpit view.

Selecting Radar

Call up either your air-to-air or ground radar MFD. Normally the air-to-air radar is the preferred choice, because of the risk of air interception before you reach any ground targets. Before taking off you may wish to change the scale of air-to-air radar, but normally this is left in the largest scale to give the earliest warning of approaching aerial threats.

Checking the NAV Map

Press the [N] key to call up the NAV map. Check the map to be certain that the waypoint selected is indeed the location you want to head for first. The selected waypoint has its name displayed in white letters. If the wrong waypoint is set, use the keyboard Arrow keys to cycle through available waypoints until the one you want is selected.

NAV map waypoints are normally selected by the program in the order directed by the mission briefing. You may change the way the mission is flown if you wish. This may interfere with a successful completion of the mission, but it may also offer a new strategy for completing a mission.

When the correct waypoint is selected, press the [N] key to return to the Close Cockpit view.

Computing Fuel

The *Strike Commander Technical Supplement* recommends that you compute your fuel at this point by subtracting 10 percent from the total available and dividing the remainder in half. The number this generates is your fuel halfway point. Check your fuel level occasionally after the mission has been underway for a while. When you reach the fuel halfway point, turn for home.

The 10 percent margin is to cover any additional passes needed to line up a landing or for a few seconds of afterburner if you are ambushed on the way home. Most *Strike Commander* missions can be accomplished well within fuel limits. Extended use of the afterburner, fuel tank hits, and long, drawn-out dogfights can change this.

Fuel allowances in *Strike Commander* are much more generous than in real life. This design decision gives you more air time and thus more play per mission.

Preparation for Takeoff

When the preflight check is completed, you are ready for takeoff. A few simple steps start the F-16 rolling down the runway.

First, put your flaps down by pressing the **[F]** key. Having the flaps down changes the shape of your wings and provides additional lift for the takeoff. Flaps also increase drag, but during the takeoff this is not significant in comparison to the benefit of the added lift.

Second, punch **[O]** on the keyboard to set the throttle at full afterburner. On the HUD, the throttle setting should read AFT 5 for afterburner 5, the maximum setting. Figure 13-2 shows an F-16 at this point. Notice that the throttle setting is at AFT 5, and that the gear and flaps are down. The F-16 is rolling down the runway and only a few seconds from takeoff.

The *Strike Commander Technical Supplement* says that the brakes should be on before the afterburner is turned on. For real aircraft, the brakes hold the aircraft while thrust builds to the point at which it can lift the aircraft. When thrust is high enough, the brakes are released and the aircraft quickly accelerates down the runway.



In Strike Commander the brakes are unnecessary and have no use in a takeoff. As soon as you punch the afterburner, the F-16 begins rolling down the runway, regardless of whether the brakes are on or not. There seems to be no discernible difference in acceleration with the brakes on or off. However, if the brakes are on as you accelerate down the runway, the nose never rotates, or lifts into the air. If the brakes are not released, you crash off the end of the runway. Brakes have no positive effect in a takeoff and risk a crash if left on. So don't bother with them when taking off.

Liftoff

Once the afterburner has been punched on, engine thrust begins to push your F-16 down the runway. The F-16 quickly accelerates. As your airspeed increases past 100 knots, the Velocity Vector Indicator begins to rotate above zero pitch on the HUD. This indicates that lift is now pulling up the nose of the F-16.

Pull back on the stick to raise the pitch to an angle between 15 and 25 degrees. This pitch increases the angle of attack of the wings into the wind, increasing lift, and the F-16 climbs into the air.

Now you'll want to decrease drag on the aircraft, so retract your landing gear by pressing the **[L]** key and bring your flaps back up by pressing the **[F]** key. The words GEAR and FLAPS disappear from the top right of the HUD.



Figure 13-2
F-16 ready for
takeoff

Unless there is an emergency, change the throttle setting by pressing [4]. This sets the throttle to military 4, which is sufficient thrust to keep you climbing.

You are now airborne and climbing. Head for your first waypoint to begin the mission.

Landing

A *Strike Commander* mission does not end until you have returned to the ground. The preferable way to do this is to land the F-16 safely on a runway at a friendly air base. A crash landing results in the death of your character and the end of this particular game (you may start over). A crash of any sort has the same effect. You may also eject from your aircraft before crashing, if you cannot land because of landing gear damage or lack of fuel.

The easiest way to land the F-16 is to have the autopilot do it. Landing the plane yourself is challenging but becomes much easier with experience. Landing the F-16 yourself adds to the score for the mission.

Landings are difficult for several reasons. It is difficult to spot a runway visually until you are relatively close. This makes it hard to line up precisely (or “dead on”). It is sometimes difficult to judge whether you are approaching too fast or too slow. A proper landing requires a slight upward pitch as you come in, but too much pitch or too much speed forces you up too high to land.

The designers of *Strike Commander* have compensated for some of these difficulties by making landings relatively forgiving, and

even more so when the option Easy Landings is turned on. You can also turn off the Stalls and G Effects options to make landings even easier.

The basic requirements for landing are to bring the F-16 in slowly, in a gradual descent, such that it touches down lightly at the front of the runway and then taxis down its length to a stop.

Autopilot Landings

To have the autopilot land your F-16, simply be near the runway you wish to touch down at and press the **[A]** key. You'll switch from the Close Cockpit view to a modified Chase Camera view, above and behind the F-16. From this vantage point you can watch the F-16 drop down to the runway and land. The autopilot takes care of everything. You don't have to enter another command until the end of mission message appears, asking whether you would like to keep playing, save your game, or quit. Figure 13-3 shows the view of an autopilot landing.

The only requirements for an autopilot landing are that the runway must be operating and you must be near it. If you can see it on your radar, you are close enough. If you fly into a runway location on autopilot, you arrive within the area from which the autopilot can land.



The autopilot will safely land the F-16 when the landing gear is damaged. (Damaged landing gear is noted on the Damage display when the two circles representing the gear are yellow.) When landing yourself, there is no effect due to damaged landing gear. It operates as if undamaged. Neither you nor the autopilot can land safely with destroyed landing gear (marked in red on the Damage display).

Finding the Runway

The first step in making a landing is finding a runway. For every *Strike Commander* mission there is a runway at the base from which you take off. In at least one case you won't be able to land there when the mission ends. In this case there is an emergency runway available. In the training world, there are usable runways at Strike Base and Mayday Canyon. The Mayday Canyon runway is defended, however, and defenses should be destroyed before a landing is attempted. The runway at Wipeout Rock is not operational. You cannot land on the aircraft carrier at Isaac Bay.

Use the NAV map to designate the location of a runway as your waypoint. Line up the Waypoint Caret with the Current Heading Tic to head for the runway's location. Watch the Distance



Figure 13-3
View of an
autopilot landing

to Waypoint readout on the HUD to see when you are getting close to the designated location. The waypoint is very close to the runway in any area containing one.

When you fly within 5 nautical miles or so, activate the Vulcan cannon in Strafe Weapon mode and turn on your ground radar. Activating the cannon allows you to turn on the ground radar and also to designate ground targets. Watch for the runway to appear on the ground radar. Once the runway is on radar, you can begin lining up your approach for landing.

To help spot the runway visually, press the **[T]** key to designate a target. The nearest target is normally the hangar or tower found near the runway. Look for the glint of light in the distance that marks the location of your target as you fly toward the runway. When you see the glint, head a little to the left of it. This is the beginning of your approach to the runway.

If you are flying north, the glint is the tower on the right side of the runway. If you are flying south, the glint designates the hangar, also on the right side as you approach from this direction.

If you are playing with the option 360 Degree Lock on, note that the same building remains designated as your target regardless of the direction from which you approach. In this case, if you fly back and forth down the runway, the runway appears first to one side of the target and then to the other. To keep the designated target to the right of the runway as you approach, quickly switch weapons to the Vulcan in Dogfight mode and then back to the Vulcan in Strafing mode. Then re-select a target. This flags the

nearest target, which is always to the right of the runway as you approach it end on.

If you use the autopilot to fly into the runway's location, look for the runway on ground radar immediately after you resume control of the aircraft. You can also go to the NAV map, make this location your waypoint again, and then follow the heading indicated by the Waypoint Caret back to the runway.

Runway Approach

A proper landing approach heads for the end of the runway and directly down its length. Most runways in *Strike Commander* are oriented north-south. If you are headed directly toward one and along its length, you are on a heading of either 0 or 180 degrees.

The approach must also be made at a sufficiently low altitude and airspeed for the F-16 to touch down at the near end of the runway.

Lining up on the Runway

Once you have located the runway, head toward it, aiming either for its position on the radar or slightly to the left of the glint of light marking the tower or runway you can see through the windscreen. When the runway comes into view, judge quickly whether you are headed directly down the runway or at an angle to it. You want to be headed directly down it. If you are not, overturn past the runway and then turn back toward it so that you are heading directly down its length. Figure 13-4 shows an F-16 headed for a runway.

Once you are lined up roughly down the runway, stop using the stick for turns and instead attempt to get the F-16 as level as possible. Use the rudder for final adjustments in heading instead of the stick.

The sooner you get lined up on the runway for a direct approach, the sooner you can concentrate on adjusting altitude and speed to bring you down on the runway.

Approach Speed and Altitude

With the runway in view, the throttle setting should be MIL 1 and airspeed below 200 knots. Press the **[L]** key to lower the landing gear and the **[F]** key to lower the flaps. Both the flaps and gear increase drag, slowing you down. If you are going faster than 200 knots, even with the gear and flaps down, put on the air brakes by pushing the **[B]** key. If the brakes slow you down too much, so that your airspeed falls below 100 and you begin to lose altitude



Figure 13-4
An F-16
approaching a
runway

rapidly far in front of the runway, press the **[B]** key again to take the brakes off.

When the runway first comes into view, you should not be much higher than 2,000 feet. Pitch forward to bring your altitude down. As you get within 2 nautical miles of the runway you should be below 1,000 feet. If you have to pitch down to lose altitude, do it sooner rather than later. Get down to 500 feet within 1 nautical mile. Once you are down to 500 feet or even lower, level out the pitch or bring it slightly up, no more than a few degrees. Figure 13-5 shows an F-16 getting close to the runway. Note the low airspeed and slight upward pitch.

Watch your Altitude Above Terrain readout on the HUD and the front of the runway. If you are coming down far short of the runway, put up your flaps or take off the brakes. If this doesn't help, increase the throttle. If you continue to come down short, punch up your throttle and abandon this landing attempt. It is too difficult to increase speed with the throttle and still make a landing. Come around and try again.

If you appear to be flying too fast and heading far down the runway, make sure the gear and flaps are down, then put on the air brakes. If this doesn't slow you and drop your altitude, you are probably going too fast for a landing on this pass. Pull up and come around for another try.

Note that this is not how real aircraft land, but it works in *Strike Commander* and is relatively easy to understand.



Figure 13-5

An F-16 closing with the runway

The Immelman Approach

The Immelman turn is very useful when lining up an approach to a landing. Use your first pass at the runway just to line up with it directly and then use the Immelman turn to bring you back for a real landing approach.

As you close with a runway, turn as needed to fly directly down the runway. As you pass over it and past its end, maintain an altitude of 2,000 feet or slightly less. If you are lined up directly with the runway as you fly down it, your heading is normally either 0 or 180 degrees. Maintain that heading and fly away from the runway. Airspeed should be 300 to 400 knots at a throttle setting of MIL 4.

Once you have flown over the runway, go to the NAV map and make the runway location your waypoint again. Then return to the game and continue flying directly away from the runway. As you fly away, the Distance to Waypoint readout on the HUD tells you how far away the runway is.

Alternatively, if you have the option 360 Degree Lock turned on and a runway building is designated as your target, the Range-to-Target readout on the HUD tells you how far you are from the building, and roughly how far from the runway.

When you are 5 or 6 nautical miles from the runway, make an Immelman turn, but carry the loop back down near your original altitude before rolling into the opposite heading and pulling up. You should be headed directly back toward the runway on the opposite heading. If you flew away from the runway on a

heading of 180 degrees, you should be headed back toward it on a heading of 0 degrees, and vice versa.

Drop your throttle setting to MIL 1 by pressing the **[1]** key. Now look for the runway on radar or look for the glint of the selected target to begin a new approach.

The beauty of the Immelman turn in this case is that it allows you to change your direction by 180 degrees, very quickly and accurately. So long as you keep flying back and forth directly down the runway, Immelman turns at each end bring you right back down its length. Keep making Immelman turns until you have achieved a good landing approach and can touch down.

The Immelman approach is especially useful when you use the autopilot to fly into the runway area. When you do this, you are in a poor position for an immediate landing. Instead, bank sharply and attempt to fly down the length of the runway. This gets you set up for an Immelman turn and then an excellent landing approach on the way back.

Touching Down

As you approach within 1 nautical mile, your speed must fall below 200 knots and your altitude decrease from 500 feet toward 0 feet. Try to do this while keeping your pitch a few degrees above level. Put the air brakes on and take them off to adjust your speed.

Aim to touch down right on the hash marks at the beginning of the runway. Miss the hash marks long, if necessary, not short. As you come closer and closer, keep the pitch slightly above 0 degrees. If you seem to be losing altitude too rapidly, take off the brakes or increase the throttle. Do not pull back on the stick, as this may stall the plane and lead to a crash. If you are not losing altitude quickly enough, cut the throttle or put the brakes on.

Real pilots use pitch to control speed and throttle to control the descent, or sink rate. Because the flight models in *Strike Commander* are somewhat relaxed, you can effectively use landing techniques that would not work in the real world. For example, you can cut the engine off in a *Strike Commander* landing to reduce speed, something a real pilot would never do.

Use the rudder as necessary to maintain a heading directly down the runway. Center the F-16 on the white dashes that run the length of the pavement. You'll want to touch down right in the middle. When you do finally draw near the runway, it seems remarkably wide for all the trouble that you had lining up on it. Figure 13-6 shows an F-16 just before touchdown.



Figure 13-6



An F-16 just before touchdown

Touchdown occurs when the F-16 loses sufficient altitude to reach the pavement. The Altitude Above Terrain readout shows 0 feet once you are lower than 50 feet, so touchdown may occur any time after that point is reached. You may see a slight jarring through the windscreen.

Touchdown may be watched and controlled from the Chase Camera view, accessed by pressing the **F2** key. Once you are committed to landing and very close to touch down, switch to this view. By watching from this perspective, you may be able to judge better whether to use more brake or not, and whether to pitch up more or not. Try this in practice first before doing it during a game mission. Figure 13-7 shows the view of a landing from the Chase Camera.

At this stage of a landing, you should be using only the stick, the **B** key, the **F** key, and maybe the throttle keys. This close, you may be able to see what is going on better from the Chase Camera than from the cockpit.

Shut Down

After you touch down, continue to use the rudder if necessary to keep the F-16 in the middle of the runway. Put the brakes on now if they haven't been on all the way down. Press the  key (usually to the left of the  key) to turn off your engine. Figure 13-8 shows an F-16 just after touchdown, still taxiing down the runway.

If you are in the middle of the runway, your speed should drop to 0 knots and the brakes will take hold, bringing you to a stop. You have landed.



Figure 13-7
Chase Camera
view of a landing

Crashes during Landings

If you crash during a landing, take the time to figure out why you crashed so that you can avoid that mistake in the future. Common causes of crashes are touching down short of the runway, taxiing off the edge or end of the runway, nosing in, coming down too hard, stalling during approach, or coming down in a roll. Understanding why each of these situations causes a crash can help avoid them.



Figure 13-8
An F-16 just after
touchdown

Landing or Taxiing off the Runway

Landing short of the runway, or taxiing off the end or either side, results in a crash. The program determines that you have crashed if your F-16 has any contact with the ground other than the pavement of a runway.

Nosing in

If you are pitched forward at the moment of runway contact, you may crash if the pitch is too steep. The F-16 is designed so that the bulk of the plane's weight is absorbed by the rear landing gear under the wings. If you are pitched too far forward, the weight may fall on the front landing wheel. This may not be strong enough to hold the weight of the plane and it can collapse. If it gives way, the F-16 comes down onto the pavement and the program determines that you have crashed.

The program crashes your F-16 if any part of the plane other than the landing gear wheels touch the pavement.

Hard Landings

Coming down too fast causes the landing gear to collapse. The F-16 comes down onto the pavement itself, as it does when you nose in, and the program determines that the plane has crashed.

Stalling during Approach

If you have not turned off the Stalls options they are a hazard as you attempt to reduce airspeed on the final approach to the runway. A major cause of stalls during landings is making a sharp bank when you are low and flying slow. A sharp bank reduces lift quickly and you may not have enough speed to straighten the aircraft, so that lift is restored. A stall while you are low can mean a sudden dip and crash.

Pulling up the nose at a low speed during a landing is another way to stall.

As you approach touchdown, keep the F-16 level and your airspeed at 100 knots (minimum). You can touch down safely at that speed if your pitch is slightly up. Hit the brakes quickly and turn off the engine.

Touching down in a Roll

Touching down when the F-16 is not level is hazardous because the low wing tip may hit the pavement. If this happens, the program detects that part of the plane other than the wheels is touching the ground and a crash occurs.



Figure 13-9

View of a pilot after
ejecting

Once you are close to the ground, between 0 and 100 feet, keep as level as possible. To make heading adjustments, use the rudder only. If you are still lined up poorly and at risk of going off the runway after touchdown, don't bank. Level out, pull up, and punch up the throttle to pull up and away, aborting this landing attempt.

Ejecting

If your F-16 is badly damaged or too low on fuel to land, you may eject from the plane by pressing the **[Ctrl] - [E]** keys. Try to be flying level, upright, and above 1,000 feet when you eject. Don't eject when you are upside down or very low. You may not survive. Figure 13-9 shows the view of a pilot after ejecting.

You must eject if your landing gear is destroyed, if you are out of fuel, or if other destroyed aircraft parts leave the F-16 impossible to control. (Destroyed parts are marked in red on the Damage display.) In *Strike Commander* there are no safe crash landings or belly landings. You may land on damaged landing gear with no chance of crashing due to the gear. The autopilot will also land you safely on damaged landing gear.

ADVANCED FLYING



14

Strike Commander can be played and enjoyed at several levels of difficulty, as discussed earlier. The designers have included a large number of game options that can be mixed in to customize play as you wish. Many of these options affect how the F-16 flies and how it is controlled. At one end of the play spectrum, the F-16 is very easy to fly, letting you concentrate on bombing and air-to-air combat. As you move toward the other extreme, flying is much more difficult, and success in combat is even more so. This chapter discusses some of the issues that become more important as you play at a higher level of difficulty.

The first issue is *G* forces: the effects of gravity on both the F-16 and the pilot. Turning off the effects of gravity is probably the one option that most eases the difficulty of flying. Leaving the effects of gravity on forces you to become a real pilot. You can no longer pull continuous 9 *G* turns. Now you have to rely much more on situational awareness and advanced maneuvers to outsmart and outfly your opponents.

Turning on *G* forces also makes the afterburner more important. With gravity off, you could remain at one throttle setting for an entire mission and have a good chance of success. With gravity on, however, you need to make many more airspeed adjustments, and the throttle changes much more often.

The flaps and airbrakes are of little consequence to new pilots, but they can be useful when flight options are more demanding. In the previous chapter, flaps and brakes were mentioned because

they can help control the aircraft. Flaps and airbrakes may be useful during other maneuvers as well.

Air-to-air combat is substantially different when gravity is in effect. Dogfights are no longer just a simple series of 9 *G* turns. Now the relative flying ability of various aircraft becomes more important. You have to be smarter in combat, better at anticipating enemy maneuvers, and more accomplished with aerial maneuvers.

At the end of this chapter a number of advanced combat maneuvers are discussed. These can be especially helpful when the level of difficulty for flying is high.

G Forces

Gravity is one of the four physical forces of flight discussed in Chapter 2, and it is the main force which must be overcome for flight to be possible.

In addition, gravity can have important effects on both the plane and pilot during maneuvers in which the aircraft is pulling against the force of gravity or pushing toward it. These types of maneuvers alter the gravitational force the pilot and plane are feeling at any moment. Humans cannot tolerate gravitational forces too far in excess of what is considered normal (1 *G*) without suffering impaired function. Aircraft put under stress beyond the tolerances for which they were built may pull apart.

As a game option, the effects of gravity on pilots may be turned off or left in effect. This option does not interfere with the normal physics of flight. It only prevents pilots from suffering black-out or red-out.

The Effects of *G* Forces

A "*G*" is a unit of force from physics, equal to the force exerted by gravity on your body when you are standing at rest at sea level. The gravitational force of the Earth overwhelms the gravitational force of the Moon and other heavenly bodies to pull you down with a force of 1 *G*. This force gives your body and other objects weight.

Multiples or fractions of *G* are used to measure the changes in this force when your body is accelerated. The force of gravity can be positive, as it is in normal everyday life. You feel multiple positive *G*s when you are pulled upwards (away from the earth), or accelerated against the pull of gravity. Under the force of multiple positive *G*s you feel your weight increase.

The force of gravity can be zero, giving you the sensation of weightlessness. It can be negative when you are pulled downwards, or accelerated toward the pull gravity. You feel negative Gs going down a roller coaster and positive Gs going up.

Gravitational force is an important consideration for pilots because beyond a certain point the pressure of too many positive or negative Gs can interfere with your normal body functions, rendering you helpless or unconscious. As positive Gs increase, blood is pulled away from your brain and eyes, first causing *gray-out* (lack of color vision), and eventually *black-out* (unconsciousness). As negative Gs increase, blood instead rushes to your head, swelling or bursting capillaries in your eyes, and causing what pilots call *red-out*.

According to the *Strike Commander Technical Supplement*, a normal human can experience 8 to 9 positive Gs or 2 to 3 negative Gs for a few seconds with no permanent damage. Very high positive Gs can be endured for the instant required for ejection from an aircraft.

Positive Gs are felt when aircraft climb and/or bank (turn), or when pilots eject. Negative Gs are felt when a pilot dives sitting upright or stalls. For this reason, many pilots roll over and dive upside-down so that they suffer positive Gs on the way down instead of negative ones.

G-Force Effects in *Strike Commander*

In *Strike Commander*, too many positive Gs turn the screen gradually more monochrome and eventually it goes completely black. The completely black screen simulates pilot unconsciousness. Too many negative Gs turn the screen increasingly red. A completely red screen simulates being temporarily blinded.

So long as you maintain the conditions which created the G forces and caused either black-out or red-out, the screen remains black or red. If you ease up on the stick, the screen begins to regain normal color almost immediately, simulating your return to consciousness or normal vision. Figure 14-1 shows a screen partially grayed-out due to multiple positive Gs.

While the screen is black or red, you cannot see the HUD or otherwise keep track of what is going on. You may crash if you are too close to the ground. However, unlike real pilots, you cannot go unconscious. As soon as you let up on the stick, some HUD details become visible. The more you let up, the quicker normal conditions are resumed.



Figure 14-1

The effects of multiple positive Gs

The designers of *Strike Commander* have made *G* force much easier for you to tolerate than it is for real pilots. You can withstand *G* forces significantly in excess of what you could take in reality. You can conduct an entire dogfight in the dark gray spectrum, just short of black-out, with no ill effects. You can take *G* forces right into total black-out and come out as if nothing had happened. While you are blacked-out, the F-16 continues to obey your stick and keyboard commands. You just can't see what is happening.

Real pilots never risk total black-out because there is a chance of not coming out of it in time to keep from crashing. Also, sustained gray-out or red-out conditions are painful and debilitating.

Flying in the Gray

You can pull *G*s beyond what are considered normal limits. If you need to turn tightly or make another maneuver requiring high *G*s, don't hesitate. Pull until the gray is hampering your ability to see. Ease up on the stick if necessary, but don't worry about blacking-out. If black-out occurs, just relax the pull on the stick until enough of the HUD is visible so that you can carry on. If you think a few extra seconds of a hard turn would bring the enemy into sight, consider going into black-out. Continue pulling while blacked-out and then ease up to see where you are.

If you wish to make and maintain a high *G* maneuver, pull as many *G*s as you need to, but avoid blacking-out for an extended period. Keep the screen gray, but not so dark that the HUD is

not visible. There is no penalty for extended gray-out, except that it is somewhat harder to see.

Afterburner

The afterburner is an auxiliary burner attached to the tailpipe of the F-16's engine so that additional fuel can be injected into the hot exhaust gases. The injected fuel burns and provides extra thrust beyond what the engine is already producing. Turning on the afterburner immediately increases the power of the F-16 but also increases the consumption of fuel. At maximum afterburner, fuel is burned twelve times faster than it is at Throttle Setting 5.

The afterburner is on for Throttle Settings 6 through 0. Settings 1 through 5 are normal engine settings, without afterburner.

Use the afterburner when you need to increase airspeed, or maintain airspeed, during maneuvers. As discussed earlier, tight turns and climbs reduce speed. If you want to keep up speed during turns and climbs, increase your Throttle Setting. For example, if you wish to perform an Immelman Turn, consider increasing the throttle to minimize speed loss during the climb. The afterburner is also useful at the start of an Immelman Turn if you begin with insufficient speed to carry the maneuver through.

Any time you see your airspeed dropping rapidly during a maneuver, consider increasing the throttle. Rapidly decreasing airspeed may lead to a stall. Punching up to full afterburner is the quickest way to increase speed and avoid stalling.

Be judicious about the use of afterburner. It increases fuel consumption so much that extended use can seriously shorten the air time available to complete a mission.

Once your airspeed is suitably high, cut back the throttle to setting 4 or 5. In a dogfight, setting 4 is normally enough thrust for most maneuvers. Use the afterburner selectively at those brief moments when a little extra thrust is useful.

Afterburner is not used during the approach to a ground attack because normally you are trying to fly slowly to acquire the target and aim properly. However, once the ground attack weapon is launched, consider punching up the afterburner to quickly clear out of a defended location. Afterburner can be useful if you intend to finish a bombing run with an Immelman Turn. Since you approach at a low speed, afterburner can boost thrust after launch to help carry through the upward loop of the Immelman. If you enter an Immelman Turn too slowly, you risk a stall.

Afterburner is useful for any escape. It can quickly put distance between you and a pursuer. Wait until the enemy is in a different

bank than you are and then punch the afterburner. Remember, however, that afterburner has an enormous heat signature that is easy for infrared missiles to lock onto. If your Missile Warning Lights indicate that an infrared missile is tracking you, reduce the throttle out of afterburner as you drop a flare and turn.

Flaps

Flaps are movable auxiliary airfoils attached to the trailing edge of the F-16's wings. They can be adjusted to increase lift or drag. Flaps can be put down by pressing the **[F]** key. The word FLAPS appears in the top right of the HUD to indicate that the flaps are down, as shown in Figure 14-2. Once down, they can be brought back up by pressing the **[F]** key again.

Flaps are used most often during landings and takeoffs when the increased lift they provide helps control the ascent or descent of the aircraft. As discussed earlier in Chapter 13, flaps should be down for both takeoffs and landings.

Flaps may also be used during maneuvers to increase lift. Normally this is not recommended at airspeeds much over 300 knots, but in *Strike Commander* there is no penalty for lowering your flaps while flying at a high airspeed.

To see the effects of flaps during flight, set up a search-and-destroy training mission. When the mission starts, fly level for a few moments, and then press the **[F]** key to lower your flaps. Notice that the Velocity Vector Indicator immediately moves to a



Figure 14-2
Flaps down

higher position on the HUD, indicating a higher angle of pitch. The flaps have changed the shape of the F-16's wings by giving them more curvature (also known as camber). The change in shape is enough to increase lift and put you into a steeper climb.

During aerial maneuvers, there may be times when you need more vertical lift. In these cases, putting down your flaps may help provide that lift. For example, at the start of an Immelman Turn, putting down the flaps can help you accomplish the climbing half-loop more quickly. Once the climbing part of the maneuver is complete, raise the flaps back up.

Brakes

The airbrakes on the F-16 are auxiliary airfoils on the trailing edge of the wings that simultaneously go down (like flaps) and up at the same time. The effect is to dramatically increase the drag of the aircraft, slowing it down. Brakes are activated by pressing the **[B]** key. When they are on, the word BRAKES appears in the top right of the HUD as shown in Figure 14-3. The brakes are turned off by pressing the **[B]** key again.

Brakes are most commonly used during landings when you are attempting to control your approach speed. However, they also have some usefulness during combat.

During a ground attack, use the brakes to slow your approach if you are coming in too fast. Normally, just a second or two of brake is enough to bring airspeed down. Brakes are not normally



Figure 14-3
Brakes on

left on for any appreciable length of time because they cut airspeed so quickly. Use the brakes for a quick but significant drop in speed.

During air combat, brakes are occasionally useful when you find yourself behind an opponent, but travelling much faster. In this case you risk flying past him, right into his sights. If the enemy is in your sights and within gun range, you want to maintain this position as long as you can to get as many good shots as you can.

If the Rate of Closure readout on the HUD shows you are closing fast, touch the brakes to cut back airspeed and reduce the Rate of Closure. Ideally, you want the Rate of Closure to be around 0 knots with the enemy still within gun range. Touching the brakes is the easiest and quickest way to adjust your airspeed.

Don't leave the brakes on for more than a few seconds. You lose speed quickly and this is always dangerous in air combat where speed is normally critical. When you put the brakes on, leave your finger hovering right on the [B] key so you can quickly take them off.

When an opponent is close on your tail, putting on the brakes for a second or two may slow you down enough so that he flies past you. When you put on the brakes, be ready to take them off and make any maneuver needed to get the passing plane in your sights.

Advanced Maneuvers

Advanced flight maneuvers are used during air-to-air combat to gain a position advantage over an opponent, or, in an emergency, to escape. Due to the difficulty of converting real-world flying onto a computer screen, all of these maneuvers are difficult to visualize and recreate in *Strike Commander*. Some of the camera views may be helpful, but only very experienced players can simultaneously manage camera views, fly their F-16, and keep track of their opponent.

However, if you understand what a maneuver is intended to do, can recognize a situation where it may be useful, and can carry it out in principle, you can improve your score in dogfights. After many dogfights you may find that you have been performing some of the maneuvers discussed below, without being aware of it.

Advanced maneuvers discussed here are the Break, the Early Turn, the Yo-Yo Turn, the Pursuit Yo-Yo, and the Lag Roll.

The Break

A Break is a banking turn relative to another aircraft in sky. It is often a high-G turn due to strong pull back on the joystick. The three common Breaks are the Break Turn, the Break Away, and the Opposition Break.

The Break Turn

The Break Turn is an abrupt turn toward an enemy that is approaching from your side or rear. It is usually a very tight, high-G turn, made with the wings tilted up nearly 90 degrees. Remember that this type of turn cannot be maintained long without a significant loss of airspeed.

The purpose of the Break Turn is to spoil your opponent's aim, perhaps get him to overshoot your position, and allow you time to begin setting up an offensive maneuver. A Break Turn often leads into a long continuous turning maneuver where one side is trying to overtake the other. When you are gaining on an opponent in a turn, watch for him to make a Break Turn to get away. Remember that the artificial intelligence of *Strike Commander* enemies prefers to make horizontal maneuvers. When an opponent performs a Break Turn, he normally does so nearly horizontally, which can give you a great shot.

The Break Away

The Break Away is a banking turn away from an opponent's bank. For example, assume that an enemy is in your six o'clock position, right behind you. You bank to the right and left quickly in succession and keep repeating the banks. The enemy tries to keep up. When he slips up, however, and you notice that he is in a right bank while you are in a left, or vice versa, pull back hard on the stick to Break Away.

The only way you can keep track of the enemy's turns and continue flying yourself is to watch the enemy plane from the Rear Cockpit view, accessed by pressing the **F5** key. From this view, you can watch your rear and still use the joystick for flying.

Assuming that the enemy rolls over and does a banking turn to chase, immediately roll over and make another banking turn to the opposite direction. Keep your eye on your airspeed, as high-G banking turns slow you down.

The object of the Break Away is to open distance between you and a pursuer. If you can open enough space and turn fast enough, you can end up directly behind him, in his six o'clock position.

The Opposition Break

The Opposition Break occurs when two opponents both do banking turns away from each other's course. This separates the two aircraft quickly. There may be instances when you are out of ammunition or low on fuel, and not capable of continuing an air battle. In such situations, when your opponent breaks away for his own reasons, you break in the opposite direction, resulting in an Opposition Break.

The Early Turn

When you engage an opponent head-on, the Early Turn may get you into a rear position quickly. In *Strike Commander*, enemy pilots normally fly right at you, pulling away at the last second. Designate your opponent as a target (press the **[T]** key) and turn on your air-to-air radar (press the **[R]** key). Put the radar into Single Target Tracking mode by pressing the **[K]** key. You can read the heading of your opponent off the radar display.

Instead of heading directly for your opponent, head to his left or right, and climb slightly. As the distance between you closes to Vulcan cannon range, begin a turn toward him. This is the Early Turn; you are turning before you are past each other.

If the enemy turns toward you, a turning battle has started. You may have the advantage due to turning first, the turning ability of the F-16, and some energy gained by your slight climb. If he turns away instead, you should get quickly into shooting position.

The Yo-Yo Turn

The Yo-Yo Turn is discussed in principle in Chapter 9, Dogfights. It is a two part turning maneuver that can begin with a climb and end with a dive, or vice versa. You go up and then come back down, or down and then up, like the toy. The purpose of the Yo-Yo Turn is to use the third dimension (altitude) to gain a good shooting position over an opponent who is flying at a different airspeed while he turns in the horizontal dimensions (latitude and longitude, or north-south and east-west).

If you are turning after an opponent and notice that you are closing rapidly, consider pulling up slightly as you turn and roll over toward him. Press the **[Y]** key to activate the Auto-Target Tracking Camera. This camera pans over to the enemy plane. Pull back on the stick to begin diving back down toward him. Roll the F-16 so that the other plane is centered in your canopy. This should bring the top of the HUD back into sight in the

camera view. Figure 14-4 shows the Auto-Target Tracking Camera view of the enemy aircraft from the top of a High Yo-Yo Turn.

Press the [Y] key again to turn off the camera view when the enemy aircraft is visible through the windshield. Now roll out of your turn to line up a shot.

This is a High Yo-Yo Turn. The climb at the start of the maneuver bleeds off your excessive airspeed, bringing your speed close to that of your opponent. The dive closes the distance to him and allows you to come down at a good shooting angle.

The Low Yo-Yo Turn is used against aircraft that are pulling away from you. The dive at the start of the maneuver increases your airspeed, helping you close the distance to the enemy aircraft. When you are under him and well within range, pull up slightly and roll as needed to get a good shot at the underside of his aircraft. Again, press the [Y] key to activate the Auto-Target Tracking Camera to keep apprised of the situation as it develops. Once the HUD begins to appear in the camera view, turn off the camera to set up your shot from the cockpit.

Yo-Yo turns are difficult to picture and describe, especially since few enemies behave exactly as you would like. If you are having difficulty understanding how these maneuvers work and are used, experiment with them in more simple terms. For example, during the turning battle of a dogfight, watch for a situation where you are closing quickly with your target. In this case, as you turn as tightly as you can, also roll up the stick so that you gain some



Figure 14-4

Auto-Target
Tracking view from
the top of a High
Yo-Yo Turn

altitude; perhaps 500 feet. As you pull up, your airspeed should fall, and the Rate of Closure readout should also drop. Now continue the turn, but roll so that the Diamond-X is directly centered at the top of the HUD. When the target comes into view, steady the F-16 and wait to get a good shot. You have just performed a Yo-Yo Turn.

The two steps of the Yo-Yo are the mild and brief climb slightly away from the direct turn to the opponent indicated by the Diamond-X, followed by the diving turn in the direction indicated by the Diamond-X. You bleed off more speed in the climb than you regain in the dive, and then are able to spend more time within shooting range than you would without the maneuver.

The Low Yo-Yo Turn is not commonly used by Wildcat pilots because they are rarely falling behind opponents.

The Pursuit Yo-Yo

The Pursuit Yo-Yo is a useful maneuver when an opponent abandons the dogfight and attempts to escape. If your speed is only slightly greater than his, or even less than his, the Pursuit Yo-Yo can help you catch up.

When you are on the tail of an escaping opponent and notice that he is pulling away, even when you have afterburner on full, place your F-16 into a slight dive. A dive of 5 to 10 degrees may be enough to pick up airspeed and close the distance. Continue the shallow dive until you have pulled within very close gun range. Then pull up slightly to bring your gun to bear. Watch for the opponent to make a maneuver before you get within shooting range. He may not be foolish enough to just sit there and take it.

If you are trying to escape yourself, watch the Closure Rate readout to see if the enemy plane is gaining on you. If so, go into a shallow dive yourself to increase your speed.

The Pursuit Yo-Yo is limited by altitude. If you are already skimming the tree tops, there is obviously no room for a shallow dive. This may mean that the enemy you are chasing gets away, or it may mean that you must turn and fight if you are being chased.

The Lag Roll

When your opponent appears suddenly across the front of your windshield in a sharp break turn, you are going to overshoot him and pass behind. The Lag Roll is a maneuver that can cut your speed, allow you to make a tight turn, and get you back into a good shooting position. Figure 14-5 shows a situation in which a



Figure 14-5
Situation calling for
a Lag Roll

Lag Roll may be indicated. Note that the enemy plane is breaking quickly across the F-16's front, and the F-16 is going to fall out of position behind the enemy plane.

When your opponent begins to flash past and you are unable to get off a good shot, pull up slightly on the stick and roll completely over, past 360 degrees. Roll back until your opponent is visible through the top of your windshield. You can use the Auto-Target Tracking Camera to see him, or look for the Diamond-X to be centered at the top of your HUD. You are now banked properly to turn after him again, but at a reduced airspeed and a higher altitude.

Pull back on the stick and watch for him to come back into your gunsights. Level out and shoot.

The Lag Roll is another three dimensional maneuver similar to the High Yo-Yo turn. The only major difference is the Barrel Roll during the climb, which bleeds off airspeed faster than a straight climbing turn. The word "lag" in the name refers to falling behind by climbing and turning. However, the energy gained in the climb is converted into a tight turning dive that restores a good shooting position.

MISSION STRATEGY



15

Strike Commander is played in minigames called missions. These can be training missions or game missions. All missions follow the same basic steps. First you load your F-16 as you wish from available weapons. Then you must take off and get your F-16 airborne (except in training missions, which begin with you already airborne). For each mission there are goals to be accomplished, either predesigned or set up by you. Finally, you must return to base and land to get credit for accomplishing the mission.

The core of the game is the series of game missions that follow the story of the Wildcat mercenary squadron. To win the entire game, you must survive through all of the missions and be successful enough to keep the squadron out of bankruptcy.

To reach the end of the story, you need to be a skilled pilot. Before jumping into the complete game, it's a good idea to fly a few training missions first to gain experience with the F-16. You are called on to use a number of different weapon types and many of these require a certain degree of skill. Training missions are a good way to work on acquiring that skill. Understanding a few strategies for making training missions more enjoyable and useful can enhance their value.

Once into the game missions, the pressure is on. If you are killed, or fail several missions, or go bankrupt, you lose. However, it is easy to restart a game mission and try it again and again, until you have mastered it. If a particular mission is difficult to complete, it may be worthwhile to try a few training missions to develop your skills.

There is a lot of detail to this game and it may be overwhelming at first. Don't lose heart if things don't go as well as you expect immediately. There are a number of strategies and tactics for playing *Strike Commander* that can make it easier to understand and more enjoyable.

Beyond the satisfaction of accomplishing missions and watching your kills mount up on the kill board, there is a scoring system in the game that keeps a tally of how well you are doing. You can check this tally before or after any mission.

Training Missions

Training missions and the training world have two general purposes. First, they are available for practicing and gaining experience. You can begin a training mission and be practicing the game part you wish within a few moments. The designers of *Strike Commander* have made it very easy to practice any skill over and over again.

The second purpose of the training world is that it is a handy showcase for the game. If you wish to just fly around admiring scenery or do some daredevil canyon buzzing, the training world is the place. This is where you can show off the great graphics and game features to friends.

To get the most out of training, learn where specific things are in the world and how to fly there quickly. In addition, there are a few shortcuts to remember that can help make training efficient. Training can be fun, but the accomplishments and satisfaction are in the main game. You'll want to spend a minimum of time in the training world and join up with the Wildcats as soon as you can.

The Training World

The training world is shown in Figure 15-1 as it appears on the NAV map. It includes thirteen named and fixed locations, plus one unique location. Some of these locations are meant only to flag a certain geographic feature and others mark objects that can be used for target practice of one kind or another.

You can move around the training world by normal flying or by using the autopilot, as discussed in Chapter 4. You cannot fly off the edge of the training world.

Each of the training world locations is discussed below with a brief explanation of what can be found there. Note that only a few have targets for ground attack.



Figure 15-1

The training world seen from the NAV map

Destroy Bogeys

The Destroy Bogeys location is named only for dogfight missions. It is found at the top left of the training world, over the water. The *Strike Commander Playtester's Guide* calls this location Dogfight. Your F-16 always appears at this location first, regardless of mission type. For dogfight missions, the enemy aircraft you chose appear here as well. This is the only place that enemy aircraft appear in the training world. For search-and-destroy missions, you start here, already airborne.

This is the chosen location for air battles because it is over water. There is a minimum of terrain drawing for the program to do, and this allows aircraft flight to look and feel as realistic as possible. This location has the highest frame rate of any in the training world.

This location cannot be made a waypoint.

Halverston

Halverston is the only city in the training world and one of the more interesting places to fly over. Figure 15-2 shows a view of the Halverston skyline from the F-16.

This is also the most heavily bombed place on the map because within its environs there are several large buildings, two 40mm antiaircraft guns, a mobile antiaircraft gun, and a super-tanker moored off the dock area. All of these objects can be bombed with the various ground attack weapons available. This makes Halverston a primary practice area for bombing.



Figure 15-2

A view of the city of
Halverston

Practice here with rockets and cluster bombs against the small antiaircraft guns. Try strafing these targets with the Vulcan also. Practice with both CCIP and CCRP Weapon modes against all of the ground targets. Try both the Mk82 and cluster bombs in both modes. The Maverick can be used against all targets as well, but in the real game you'll use it most often against antiaircraft weapons. Try it against both types found around Halverston. Use the GBU-15 against the buildings and the super tanker. For something different, try the Durandal bomb against the supertanker also.

Notice that while Halverston is by the sea, many of the ground targets are on elevations above sea level. Experiment with the CCRP and CCIP Weapon modes to see how they work against the supertanker and then the targets inland.

Wipeout Rock

The only notable objects at Wipeout Rock are an unfinished runway and two buildings: a hangar and a tower. As noted earlier, the program does not recognize the runway here as existing for landing purposes. The *Strike Commander Playtester's Guide* says there is no runway here at all. The designers put one here in spite of this—you just can't use it. If you attempt to land, you crash.

Use Wipeout Rock for bombing practice, especially against the runway. Practice bombing it with both Mk82s and the Durandal bomb.

Roberts Pass

Roberts Pass is a very hard nut to crack. There is an important installation here, at the bottom of what looks like an extinct volcano. Placed around the rim are four surface-to-air-missile (SAM) launchers. At the bottom of the crater is the installation building and two mobile antiaircraft guns. All of these objects are ground targets. Figure 15-3 shows the building at the bottom of the crater.

The SAM launchers on the crater rim are hard to spot and hard to hit. They make good rocket practice. Be careful, however, as the terrain is very deceptive. It is quite easy to fly into the rim. If you can keep low, the SAMs may not pick you up soon enough to fire at you. If you miss and turn around to come back, the SAM launchers are on the inside of the rim, making them hard to see until you come over the top. It is much easier to attack the SAMs from inside the crater.

If you use the autopilot to fly to Roberts Pass, you arrive out of position to attack the building at the bottom of the crater. There is a SAM launcher slightly to your right.

Attacking the building and guns in the crater is tricky because you are coming down on them from the rim. Practice taking out the guns first and then the building, or just go for the building on the first pass and clear out.

For a real challenge, load rockets only and attempt to take out all of the targets at Roberts Pass with them.

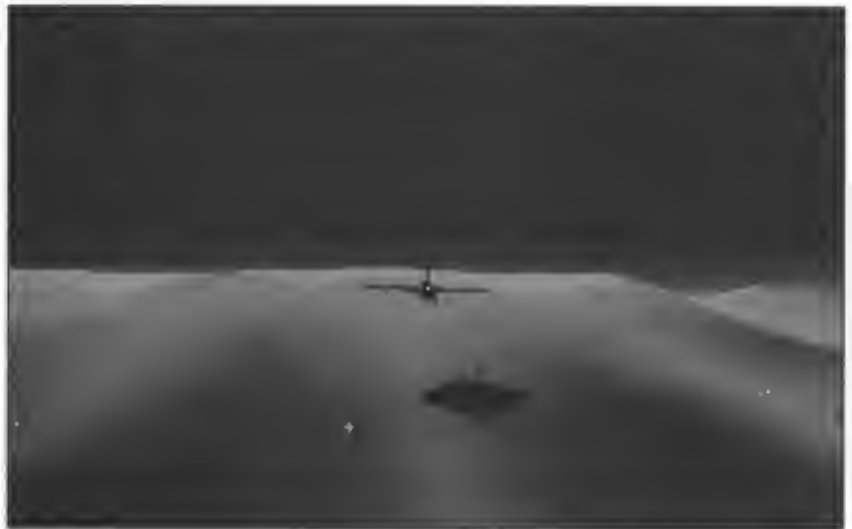


Figure 15-3

Installation found at the bottom of the Roberts Pass crater

Yenawine River

There is nothing significant about Yenawine River. It is just a river that empties into the sea. You can fly back up river into canyon country and it is a nice place to sightsee. There are no ground targets here and no reason to come here for any weapons practice.

Mayday Canyon

There is a runway at Mayday Canyon with a hangar and tower. These are found on the lip of the canyon, not down inside. This runway, unlike the one at Wipeout Rock, can be landed on and you can take off from it once down. This is the only place in the training world where you can practice taking off.

However, the runway is defended by a SAM launcher that can be hard to find because of the rolling terrain. If you use the autopilot to fly into Mayday Canyon, you are spotted quickly by the SAM launcher and missiles start heading your way.

This is a good place to practice taking out anti-aircraft defenses in tough terrain. Don't be discouraged if you fail on your first try or two. The launcher is hard to find and then hard to target with anything other than a smart weapon. You are usually right on top of it before it can be seen.

This is also a good place to practice avoiding SAMs. As you fly around here, notice how you can hide from the missiles behind terrain, such as by dropping into the canyon. The launcher should have an easier time spotting you when you come in high versus coming in low.

If you dive into the canyon, be ready with rockets or something else for the 40mm guns down by the river.

Biggs River

Biggs River is another scenic spot with no targets. It is very similar to Yenawine River. It also empties into the sea and leads up river to canyons in the interior.

Templemans Cut

Templemans Cut is one of the steep canyons in the interior of the training world. There are no targets here so it is only a place to sightsee and practice flying. Flying the canyon is fun and good practice for understanding how the F-16 turns. Try flying it at faster speeds for more of a challenge. Try flying it upside down! Figure 15-4 shows an F-16 flying down Templemans Cut.

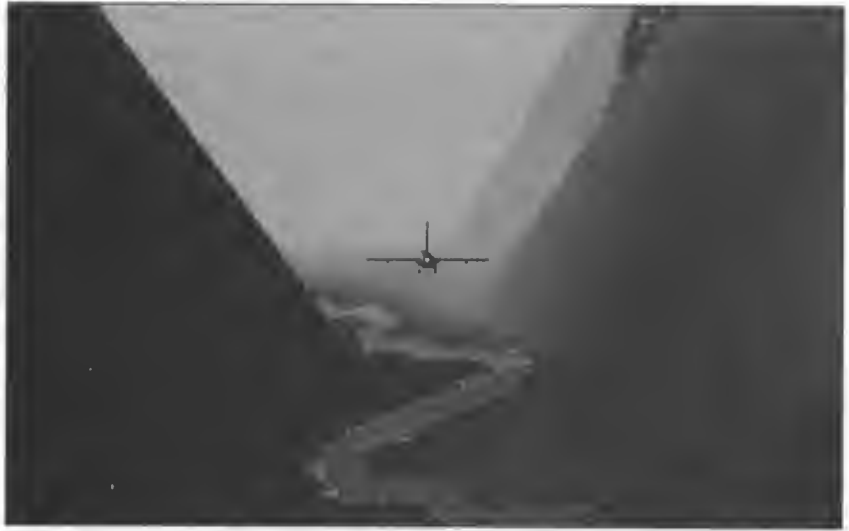


Figure 15-4
Flying down
Templemans Cut

Savage Falls

Savage Falls is another steep river canyon. There are no targets and nothing to do here but fly the canyon and look around.

Arts Reach

Arts Reach is another scenic spot, this time on the sea coast. There are no targets and no reason to come here to practice anything. There is an offshore island, but nothing is on it.

Isaac Bay

Issac Bay is the anchorage of a naval task force and there are plenty of targets here. There are eight ships in the task force: three destroyers, four PT boats, and one aircraft carrier. The *Strike Commander Playtester's Guide* says there is a tanker here also, but it has been moved to Halverston. There is also an oil rig nearby.

The ships are arranged in four groups of two ships each. In the center is the carrier with one PT boat. Forming perimeter defense are the other three groups, each consisting of one destroyer and one PT boat.

Practice attacking naval forces here. Destroyers carry SAMs, whereas the other ships mount 40mm anti-aircraft guns. Take out the destroyers first to eliminate the long-range anti-aircraft capability of the SAMs. Then you can bomb the other ships without having to worry about dodging missiles. Try taking out one perimeter

group and use that opening to get to the aircraft carrier. You may be able to attack, break off, come around again, and attack without having to engage the other ships on the perimeter.

Destroyers are much easier to blow up than PT boats because of a quirk in the program. Aircraft carriers, however, are very tough. A GBU-15 hit destroys either of the smaller ships and may destroy the carrier if dropped from a high altitude (2,000 feet or more). A Maverick can take out a destroyer, but two Maverick hits are probably needed to blow up a PT boat.

If you use the autopilot to enter Isaac Bay, you come out in a poor position and are almost immediately under missile attack. It's better to approach in normal flight and line up a good attack against a perimeter group on the first pass.

Steed Zone

The geography in Steed Zone is open rolling terrain. Of interest is the column of vehicles that are spread out below. There are thirteen vehicles in the column: eight tanks, two BMPs, two trucks, and one jeep.

This is a great place to practice strafing and bombing attacks against vehicles. Try rockets, cluster bombs, Mk82s, and even cannon strafing. See if you can destroy two vehicles with one stick of cluster bombs. Aim for a spot between two vehicles so that the blast radius reaches out to both.

Attacking these vehicles is not easy because of the rolling terrain and the dark color of the ground. The targets are very difficult to spot at a distance, making it hard to line up on them. When you do close in, it is hard to see if your sight is on them. If you can get to the point that you are consistently destroying this column with a minimum of misses, you are ready for the ground attack missions the Wildcats have lined up for you.

There are no antiaircraft defenses here to worry about.

Lemons Crevasse

Lemons Crevasse is another steep river canyon similar to Savage Falls and Templemans Cut. There are no ground targets here. All you can do here is fly the canyon and look around.

Strike Base

There is a runway here with a hangar and tower. Land here to end your mission. If you land on the runway and come to a stop, the training mission is over. There's no chance to take off again.

Optimizing Training Missions

Try the following shortcuts—the'll reduce the time you'll need to spend on training missions before joining the Wildcats.

General Training Tips

To get into training as fast as possible, press the **[Esc]** key as soon as the *Strike Commander* title screens appear. This takes you right to the Start-Up menu. Choose Training Mission from the menu.

Don't worry about attempting to land or to complete a training mission. There is no reason to do so unless you want to practice landings. Training missions are for practice. There are no points to be scored, no running tally of training kills, and no reward screens for successful training.

When you have finished what you set out to do, press the **[Alt]** - **[O]** keys, then the Exit Game button, and then the Restart button to play the mission over. This is handy when you are killed during training, or run out of live targets and want to keep practicing, or run out of ammunition. The **[Alt]** - **[O]** key combination is very useful because it allows you to end a mission quickly, minimizing any waste of time. When you have nothing meaningful left to do, get out and move on to something else.

Alternatively, press either the Abort or Continue buttons to return to the Start-Up menu. From here you can start a new training mission with new weapons or go into the game missions.

Remember, during training the Unlimited Ammo option applies to all weapons, not just Vulcan ammunition, as it does in game missions. If you have the minimum number of the selected weapon aboard, you never run out of it unless it is blown off your F-16. For example, you could load two GBU-15s and use an unlimited number of them to take out the entire fleet at Isaac Bay. An unlimited number of rockets or cluster bombs can be used to attack the armored column at Steed Zone until all the vehicles have been destroyed. Take two Durandal bombs to Wipeout Rock and bomb the runway there.

The only limits on a training mission are incurred by taking damage, being shot down, crashing your F-16, running out of targets, and running out of fuel.

Dogfight Training Missions

The only enemy aircraft that appear in the training world are the ones you select at the start of a dogfight mission. All enemy aircraft appear in the area called Destroy Bogeys. This is also the spot where your F-16 begins all training missions.

Fighter aircraft appear coming head on. Nonfighter aircraft are always heading away from you toward Halverston.

If you select multiples of a nonfighter aircraft, they appear in a formation, flying abreast of each other. They maintain this formation until they detect danger. Danger is detected only when you fire at them. At that point they normally begin taking evasive action. This can lead to some strange events.

The artificial intelligence is the same for all enemy pilots and they attempt to make the same maneuvers, regardless of the plane they are in. This causes problems with large aircraft such as the TU-95 bomber. When under attack, the pilot of a TU-95 may dive. Unfortunately, the TU-95 is a very heavy plane and the pilot may not be able to pull out of the dive. The TU-95 then crashes into the ground. Also, when several large aircraft are in formation and start to take evasive action, it is easy for them to collide, destroying two at once.

If you set up a dogfight mission against several big, slow aircraft like the TU-95, expect several of them to crash on their own before you can shoot them down. This is true even if you start at a high altitude.

Despite this problem, starting off against big, slow aircraft is useful for new pilots. You can learn much about flying the F-16, reading the various displays, and using its weapons without worrying about being shot down. After this shakedown, graduate to tougher aircraft, better pilots, and more enemy planes.

Search-and-Destroy Missions

Use ground attack missions for intense bombing and strafing practice. Go to one of the locations listed above that has ground targets and practice attacking targets there. Restart the mission when you are out of ammunition, run out of targets, or take significant damage. Keep at it until you are comfortable with the various techniques. Try different approaches to using the weapon, such as high and fast, low and slow, and diving. Not all of the techniques are appropriate for each weapon.

Practice at first with the Unlimited Ammo option on, and then turn it off. Just having a limited number of weapons increases the pressure on you and intensifies the training. Get used to having limited numbers of weapons because that's the way it is in the game missions.

Halverston is a great location for most ground attack practice. If you want to bomb without any risk of antiaircraft fire, bomb the vehicles at Steed Zone or the airfield buildings at Wipeout Rock.

Antiaircraft defenses are tougher at Roberts Pass and toughest at Isaac Bay. Mayday Canyon is somewhat difficult, especially because the antiaircraft weapons are hard to spot.

Game Missions

Specific strategies and tips for each *Strike Commander* game mission are offered in the *Strike Commander Playtesters' Guide*. In addition, a few general strategies and tactics are included here. These can help you work through the missions and complete the story of the Wildcats.

Game and Mission Chronology

Working your way through the complete series of *Strike Commander* game missions is a daunting task. Don't think that you can start a new character and work your way through, mission by mission, to the end. It is possible, but only for very experienced players who have already been through the game several times. The designer's purposively intended that it take several attempts to complete most missions. You can make it easier for yourself by saving your game regularly and by playing tough missions over and over until you succeed.

There is no way to skip forward to later missions or the final mission. You must work your way through the main story one mission at a time. There are times when several missions are available to choose from. These can be taken on in any order, but you must complete them sooner or later to continue.

Missions become more difficult as you advance through them. The first couple are relatively easy because you fly wingman for Stern, who is an excellent pilot. He gives you the chance to shoot down anyone you please or bomb targets of your choice, but if you don't succeed quickly enough, he gets the job done himself.

In later missions, you'll fly lead and choose your own wingman. You can keep the wingman with you or free him (or her) for independent action.

Your opponents in the first couple of missions are rookie pilots and old aircraft. Eventually you run into better and better aircraft, and more skilled pilots. Ground defenses get tougher as well. In the final showdown of *Strike Commander*, if you survive to that point, you must take on the leader of the Jackals—Jean-Paul Prideaux himself. Prideaux is the best rated pilot in the game, considering all attributes.

Special Action Spheres

In addition to the waypoints built into each mission, there are a number of hidden surprises called Special Action Spheres (SASs). When you enter one of these unmarked areas on the map, you trigger an unexpected game event, normally interception by enemy aircraft. Being ambushed can be a good or bad thing, depending on how skillful you are, any damage you've taken, and weapons you have left.

For the *Strike Commander* missions, these spheres are marked and described in the *Strike Commander Playtesters' Guide*. For the *Tactical Operations* missions, these spheres are described in Appendix D. If you jump around the waypoints out of order, you may miss them. This can save you some trouble, but it can also mean missed kills, missed points, and maybe some missed bonuses for the Wildcats. These spheres are missed if you use the Continue option to end a mission that you think is complete. However, if you pass through a special action sphere in autopilot, you are brought out of autopilot and into action.

Completing Game Missions

You can complete any game mission by surviving and returning safely to base. However, to complete the mission successfully you need to accomplish several goals. Surviving the mission and returning home is not the same as completing the mission successfully.

Prior to each mission there is a brief discussion between game characters about what the mission is intended to accomplish. This tells you what you need to do to complete the mission successfully. In addition, once in your F-16's cockpit you can check the NAV map. Each waypoint marked on the map has some relation to the mission. When a waypoint is selected, notation on the right side of the map tells you briefly what you are expected to do there.

For ground attack missions, or the part of a mission involving ground attack, there are targets you are expected to destroy. In some cases you need only destroy specific targets among those available, or only a few of those available. The briefing should help you decide what to go after. The *Strike Commander Playtesters' Guide* provides more specific information about what to destroy on each mission. Applicable information for the *Tactical Operations* missions is provided in Appendix D.

When you have destroyed the right targets, or enough targets to satisfy the mission goals, a message appears saying that the

mission has been accomplished and that you are to return to base. Figure 15-5 shows such a message. At this point you can go home and the mission is considered complete for scoring purposes and for the payoff promised by whoever hired the Wildcats for this mission. If you bomb additional enemy targets you can boost the points for your personal score, but the mission is no more complete. If you don't see the MISSION ACCOMPLISHED message, the mission is not considered accomplished for scoring and payoff purposes.

You can fail a mission by not doing enough to get the mission accomplished message, or by letting other events occur that result in mission failure. The *Strike Commander Playtesters' Guide* indicates what constitutes Mission Failure for certain cases. The mission data in Appendix D of this guide indicates what constitutes Mission Failure for certain *Tactical Operations* missions. Mission Failure overrides Mission Accomplished. If both events occur during a mission, it is considered a failure by the program.

If you continually survive missions but are not able to complete them, the finances of the Wildcats suffer because there is no income. Eventually you may go bankrupt and out of business. This ends the game. You can fail in a few missions, but not consistently.

Saving Game Missions

Make it a habit to save your game after every successful mission. Label saved games in some manner so you know from the file



Figure 15-5
MISSION
ACCOMPLISHED
message

name the exact moment when the game was saved. Figure 15-6 shows a Saved Game menu, in which each saved game is named for the mission just completed. For example, if the game named Mission4 is loaded, it takes up at the beginning of the fifth game mission.

You could also use names indicating the mission about to begin. Or you could name them for the part of the world they are in and number of the mission flown there. For example, the first mission flown in Mauritania might be called Maur1.

Use saved games to ratchet your way through the complete game. Play each mission in succession. Play each one over and over until you complete it. Then save it and take on the next. Begin a new session with the last saved game, which is after the last mission safely completed, and move forward through the missions. In this way you inexorably work your way to the finale.

Don't start over each time from the beginning, or even from where you left off, using the Continue Game option from the Start-Up menu. This wastes time and forces you to play the early missions over and over. When you have been through the whole series at least once, you may want to attempt to make it through nonstop, or without saving, but that is not a good strategy for new players.

You will find that some missions are extremely difficult and some are especially challenging and fun. Everyone has a favorite mission. By saving before you fly again, you can easily return to a favorite to play it again at your leisure. You can show it off to a friend.

Using the Restart and Abort Options

The first time you attempt a mission, play it as you are briefed. Follow the waypoints as they are planned. You can take along the default weapons or change them as you wish. Consider trying the default loadout first and then change it if you don't get anywhere or if you find one weapon particularly difficult to use.

Don't hesitate to use the Restart and Abort game options if a mission starts to go badly. These options are available from the cockpit by pressing the **[Alt]** - **[O]** keys. The Restart button takes you back to the runway for takeoff at the start of the mission. The Abort mission takes you back and starts the mission over at the base. This allows you to go over the briefing again to review the mission goals, and it allows you to reload your F-16 with different weapons.

Use the Restart option when you are shot down, miss important targets, lose your wingman, take crippling damage, or run



Figure 15-6
Sample list of saved
games

out of ammunition. Anything that seriously impairs your ability to survive and complete the mission is cause for restart.

Use the Abort option when you are confused about what you are trying to accomplish or when you decide you have the wrong weapons along to do the job. Don't feel that you must go out with the default weapon loadout. Freely exchange weapons as you wish. If the default weapons aren't successful, try something different or more sophisticated. With the Abort option, you may also purchase additional weapons to take along if you need them.

For example, the second mission in Peru may involve destroying anti-aircraft defenses accompanying an armored column. These are hard to take out with rockets and bombs. If you have no luck with those weapons, try the more expensive Mavericks.

Talk to Everyone

Between missions you can interact with other Wildcat pilots and other characters in the game. Talk to everyone you encounter. Pilots can give you tips on combat and you can learn something about their personalities and skills. This is one way to learn who might be a good wingman for a certain situation. Figure 15-7 shows a favorite meeting place for mercenary pilots, Selim's bar.

Remember that there is a story going on in the background of the missions. Talking to everyone helps you keep up with the story. Characters may provide hints about what mission to take on next or prepare you for future events.

Figure 15-7
Selim's bar



Once you have spoken to a character, there is probably nothing to learn from talking to that person a second time immediately. If you try it just to see and the conversation looks like the one you just had, press the **[Esc]** key to end the conversation. This way you don't have to listen to it all again.

Your Wingman

One game feature that may be critical to survival is proper use of your wingman. On each mission you take along a wingman who is there to watch your rear and provide extra firepower when needed. Once you have selected a wingman it is also important to know how best to employ him or her. Deciding which of your fellow pilots to take along can make the difference between success and failure.

For the first several missions you are Stern's wingman and then a wingman is assigned to you automatically. Once Stern is killed and you take over the Wildcats, you must choose your own wingman for all following missions. Your wingman stays on your wing and to your rear to help protect you from enemy aircraft. You can have the wingman remain with you or go off and attack on his or her own.

Selection

At the start of most game missions, you must select a wingman. Figure 15-8 shows the wingman selection screen. Move the joystick

cursor onto the pilot you want for your wingman and press Fire button 1. Once you have selected a wingman you can change the selection only by using the Abort option after the mission is under way.

Each of the Wildcat pilots has strengths and weaknesses. It can help you to know these when selecting a wingman for a mission. Some pilots are better at air combat and some are better at bombing. Some are reasonably good at both.

The *Strike Commander Playtester's Guide* gives detailed information about the skill rating of each pilot in a number of categories. Table 15-1 lists these categories and the extent of the range of each.

You can gradually draw conclusions about the various pilots by listening to them, looking at the kill board, and actually flying with them. In conversation you can learn something about the personality of each pilot. They may be boastful or factual about their past accomplishments and you can get some hints about when to use them.

The kill board shows the accomplishments of each pilot. Notice that Primetime has a lot of air kills. That indicates he might be a good choice for an air superiority mission. Phoenix is a better choice for a ground attack mission.

The following pilots are the ones from which you can choose. Note that they are listed on the kill board only by their nicknames.

Lyle "Baseline" Richards: He is better than average at the three critical skills of flying, ground attack, and air combat, but



Figure 15-8

Wingman selection
screen

Table 15-1 Pilot Attributes

Attribute	Range	
	Low	High
Trigger happy	Conservative	Wasteful
Confidence	Easily scared off	Very hard to scare
Verbosity	Never talks	Talks a lot
Loyalty	Never follows orders	Always follows orders
Flying skill	No skill	Great skill
Ground attack	No skill	Great skill
Air combat	No skill	Great skill
Showmanship	No showing off	Hot dog
Aggressiveness	Cautious	Aggressive

not superb at any of them. He is very confident, and conservative with ammunition. He is average on aggressiveness, but the most loyal wingman you can have.

Baseline is a good choice when you are especially concerned about having your wingman stay with you.

Lyle gets killed in an early *Tactical Operations* mission and there is nothing you can do about it.

Billy “Primetime” Parker: Billy is the best dogfight pilot in the squadron, an excellent flyer, extremely aggressive, and very confident. Just ask him, he’ll tell you. However, he is trigger happy and only average on ground attacks, which require patience and precision. As to being a show-off, there is not enough mustard in Istanbul to cover this guy.

Despite his shortcomings, Billy is superb in an air battle. If you are expecting a tough struggle in the air, he is an excellent choice.

Gwen “Phoenix” Forrester: Gwen is the best ground attack pilot in the squadron. Beyond that she is above average in most categories. She is only an average pilot.

When a mission entails destroying difficult ground targets, Gwen is an excellent choice. She is very good against lots of small targets, especially when the air defenses are tough. Let her go in on her own. She may be a slight handicap, however, if you need to fight your way into the target location through especially tough air patrols.

Miguel “Zorro” Schraeder: Miguel is the most confident of the Wildcats and for good reason. He is a very good pilot and

way above average in both ground attack and air combat. He is very loyal, conservative with ammunition, and all business. His aggressiveness is about average for the Wildcats.

Miguel is a great choice for a mission that is going to require both air combat and ground attacks. He is good enough at both to be an asset, and stays on your tail if you need him there.

Clayton “Tex” Travis: Tex is nearly as good in a dogfight as Billy, but more conservative with ammunition and better in ground attacks. He is not as good a pilot as Billy, however. He is also nowhere near the show-off that Billy is.

Tex is a good choice for a mission that requires some ground attack skills but also is expected to involve tough air patrols. He can hold his own against most pilots in the air, and still put a lot of firepower on ground targets.

Using a Wingman

Having a wingman is immediately useful in an air battle if he or she stays with you and covers your tail. When an enemy plane is at your rear, your wingman tells you so. It’s up to you to decide whether to break off what you are doing and evade (usually the recommended choice), or let the wingman go after the plane on your tail. If you are a risk taker, you can make that judgment on the basis of what you know about your wingman. If your wingman is a good air fighter, give him a chance to bounce your pursuer. If your wingman can take on the enemy, you’ll receive a message saying so.

You can also decide to free your wingman and let him go after enemies. This can reduce your score of kills but may speed up the mission. To free your wingman from covering your tail, press the [C] key for the Communication interface display. Then press the number for your wingman’s channel and choose the Break Formation option. This frees the wingman to find his own targets.

The Break Formation command is also useful during ground attacks. Your wingman does not attack ground targets unless you tell him to do so by this command. When you are trying a mission for the first time, hold off giving the Break Formation command to see if you can carry out the mission by yourself. This gives you the most points and probably saves expensive weapons. If you run into difficulties, try the mission again and tell your wingman to break formation as you approach the target location and see if that helps you get through the mission.

When the mission is over, give the Build Formation order to restore the wingman to his normal position off your rear.

Squadron Management

Once you have taken over command of the Wildcat Squadron, a number of additional duties fall your way. You are now responsible for the financial well-being of the group. You must bring in the money that keeps the squadron going.

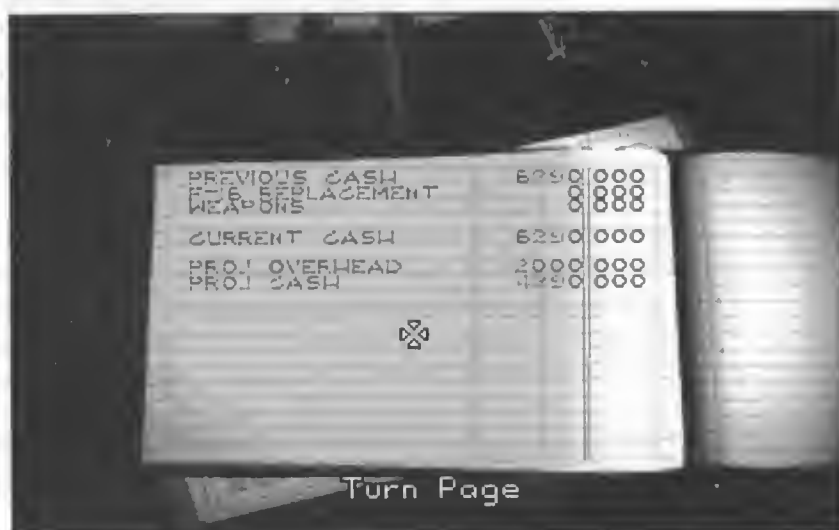
Money is obtained by contracting to carry out missions. A payoff is made once the mission is completed successfully.

Money is used to cover the projected overhead expense of each mission and to procure new aircraft and weapons. You are responsible for deciding what weapons are needed and for buying them.

Finances

The current state of the Wildcats' finances can be checked between missions at either your home base or at the Strike Base. Look either in the base tent or Virgil's office for the ledger, and open it. You can read from the ledger the current balance of money available to the Wildcats. Figure 15-9 shows the ledger and the cash available.

The projected overhead is the expected cost of mounting the next mission or for changing bases. A typical mission might cost \$2,000,000 to mount and changing bases may cost \$500,000. The overhead for a mission includes all expenses related to flying, such as fuel and Vulcan ammunition. Aircraft fuel and cannon ammunition is already figured into the projected overhead of the mission. Using more or less fuel or ammunition on a mission has no effect on the overhead expenditure.



PREVIOUS CASH	6050 000
FUEL REPLACEMENT	8 888
WEAPONS	
CURRENT CASH	6250 000
PROJ OVERHEAD	2000 000
PROJ CASH	4250 000

✕

Turn Page

Figure 15-9
Wildcats' ledger

If you end a series of related missions with a negative cash balance, the Wildcats may go bankrupt. If that happens, the game is over and you lose. Figure 15-10 shows the Wildcat base up for sale after the Wildcats have gone bankrupt.

If you complete each game mission, repeating it over and over if necessary until you do so, bankruptcy is not an issue until near the end of the game. At that point, factors out of your control come to a head in the game's finale.

Choosing Missions

You earn money by contracting for missions and completing them. Missions are obtained and accepted at Selim's, the bar in downtown Istanbul. When it is time to select a new mission, the jeep is on the tarmac outside the hangar of the Wildcats' base. Click on the jeep and you are taken to Selim's.

Inside Selim's there is a restaurant area past the bar called the mission pool. Here fixers sit at various tables. Click the pointer on the fixers to talk to them and hear what they have to offer, if anything.

Once a fixer has outlined a mission to you and the fee for doing it, you can choose to accept the mission or reject it. Once you have accepted a mission, return to your base to carry it out.

You can reject a mission and come back later to accept it. If you accept a mission, you can change your mind. Go back to the fixer and you can reject the mission.

If you accept a mission and complete it, payment is normally made directly to Virgil. The cash received shows up in the ledger after the mission is accomplished.



Figure 15-10
Wildcat base for
sale following
bankruptcy

Weapons Procurement

Prior to flying a mission, check the weapon inventory of the Wildcats to be sure that you have on hand enough of the weapons you wish to take along. Weapons available can be checked at the Strike Base tent or in Virgil's office at the Wildcat base. The ledger shows the inventory of weapons currently available to you. When the ledger is open, click on the second page to see the weapons list. Figure 15-11 shows a typical weapon inventory.

Next to the name of each weapon is the number available. If you think you'll need more of a particular weapon, you must purchase them.

Purchasing Weapons

To purchase weapons, go to either the Strike Base tent or Virgil's office and click on the weapon catalog. This opens the Weapon Purchase display, as shown in Figure 15-12.

Click with the left mouse button on the part of the catalog page that shows the weapon you wish to buy. When you do so, a receipt for the weapon appears on the table and the money spent for the weapon is deducted by the calculator from the Wildcats' account. You may purchase as many weapons as you can pay for; you also have credit to purchase an additional \$1,000,000 worth of weapons.

If you buy several of one type of weapon, the receipt changes to show multiples of that type. You are given a receipt for each type of weapon you purchase. For example, if you purchase six

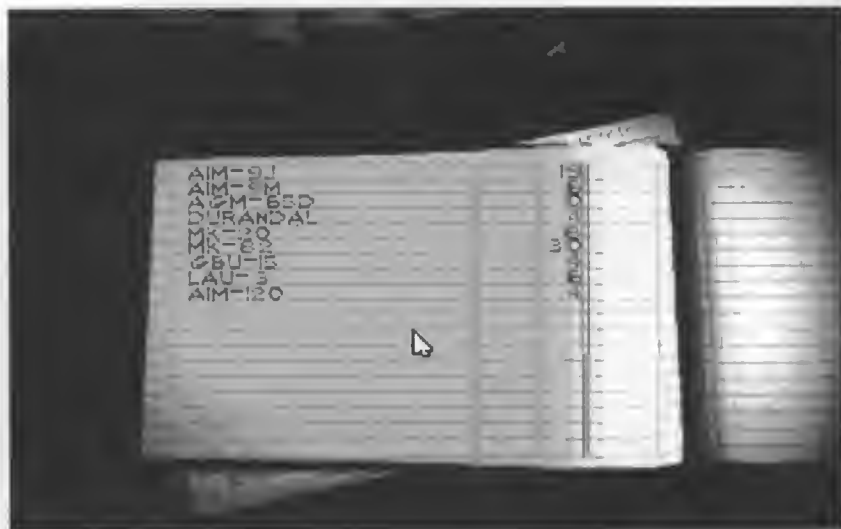


Figure 15-11
Wildcats' weapon
inventory



Figure 15-12
Weapon Purchase
display

Mavericks, you get a receipt for Mavericks showing that six were purchased.

Change pages in the catalog by clicking on the upper page corners. You can go forward in the catalog and then back again. At the back of the catalog are some package deals.

If you change your mind and decide not to buy a certain weapon, click on the advertisement with the right mouse button or click on the receipt with the left mouse button. Each click returns one weapon. The money you spent for a returned weapon is added back to your cash balance.

You may purchase weapons before any mission, but you must do so before leaving the tent or building. If you click on the F-16 to fly the mission, it is too late. In this case you must get into the air, press the **[Alt]** - **[O]** keys, the Exit Game button, and the Abort button to start the mission over early enough to buy weapons.

For each *Strike Commander* mission, your wingman has a preferred loadout. If these weapons are not available, the wingman flies without them. The *Strike Commander Playtesters' Guide* shows the wingman's preferred loadout for each mission. Be sure that you have these available in addition to what you wish to take before you fly the mission.

There is no benefit gained from having large numbers of weapons available. Keep your purchases close to what you actually need. The only reason to buy extras is to save money on package deals.

Package Deals

In the back pages of the weapon catalog there are some package deals available. Each deal offers a number of weapons in a group at a discount price. Table 15-2 shows the four package deals available.

The savings for each package is the amount saved over the individual purchase prices.

Packages 1 through 3 are especially attractive. Package 1 offers a lot of explosive firepower at a great savings. You can look at it as getting either the GBU-15s or the Mk82s nearly for free. Package 2 contains the very useful AIM-9Ms. Although the AIM-9Js are not as attractive, they are often included in your wingman's loadouts, so you'll want to have some on hand at all times. Package 3 is also attractive because Maverick missiles are very useful ground attack weapons, especially against antiaircraft defenses. Package 4 is the least attractive because the savings are not significant and the AIM-9J is the least useful air-to-air missile. For the money, the AIM-9M is a better choice.

Know Your Enemies

For most of the game missions, there is no significant advantage in knowing how skillful opposing pilots are, or in knowing what enemy planes are capable of. If you are unable to complete a mission after several tries, however, it may pay to consider what you are up against, what weapons the enemy has been using, and what the enemy has been doing.

Enemy aircraft are most commonly encountered in pairs. A pair consists of a lead plane and a wingman. Normally the planes are of the same type and carry the same weapons.

Enemy Pilot Attributes

The *Strike Commander Playtesters' Guide* includes information about the pilots that you encounter around the world. Enemy pilots are rated for the same attributes that Wildcat pilots are, as listed in Table 15-1.

Three attributes of enemy pilots are adjusted when you set the difficulty level of play. These are flying skill, and air-to-ground and air-to-air combat skills. The other pilot attributes are unaffected by level of difficulty. You may encounter an ace pilot, but his flying skill falls way below average if you are playing at a Rookie difficulty level. The toughest opponents are ace pilots when you are playing at the Ace difficulty level.

Table 15-2 Weapon Package Deals

Package	Contents	Cost	Savings
1	2 GBU-15s 24 Mk82s	\$250,000	\$190,000
2	6 AIM-9Js 6 AIM-9Ms	\$450,000	\$90,000
3	10 AGM-65Ds	\$800,000	\$200,000
4	12 AIM-9Js	\$300,000	\$60,000

When you encounter a pair of enemy aircraft, assume that the lead pilot is the most skilled. Normally, wingmen are junior pilots assigned the less glamorous task of covering the lead pilot's rear. Common pairings are ace/rookie, veteran/rookie, and rookie/rookie. Less common are ace/ace, ace/veteran, and veteran/veteran.

If the same pilot continues to cause you difficulties when you retry a mission, try letting your wingman go after him while you take on the second plane. The score for killing enemy planes is not related to how sophisticated the plane is. Also try using better weapons or a barrage of missiles against him. He may have difficulty avoiding them all.

To complete *Strike Commander*, you must shoot down Jean-Paul Prideaux. He is the highest rated pilot in the game, overall.

Enemy Aircraft

The *Strike Commander Technical Supplement* reports only the type of cannon an enemy plane carries. In addition, most, if not all, carry missiles. The missiles they carry are the same three types available to you and are specifically reported for each mission in the *Strike Commander Playtesters' Guide*. You can guess what missiles an enemy has by how he uses them. A long-range radar missile must be an AIM-120. A frontal shot from a Sidewinder is almost certainly an AIM-9M. A Sidewinder fired at your rear could be either an AIM-9J or AIM-9M.

Enemy fighters carry at least two air-to-air missiles and many carry four. Assume less sophisticated planes are carrying AIM-9Js and newer planes have AIM-9Ms. The best planes of American manufacture are probably also carrying AIM-120s.

When planes of two different types are facing you at the same time, attempt to destroy first the one you consider most dangerous. The better plane probably has better weapons and a better pilot.

Scoring

The *Strike Commander* program maintains a running tally of your score which is updated at the end of each mission. You can check your score while at base by pressing the [Alt] - [S] keys. Figure 15-13 shows a sample player score report.

Your score is an additional way to measure how well you are doing in the game, beyond actually completing all missions. Once you have completed the game, play it again and try to raise your score.

Remember that the scoring system is only another way to measure how well you are doing, or to judge how expert you are getting. The major way to measure success is to reach the end of the Wildcat's saga still in command of the squadron with all missions accomplished. This is more than enough challenge for most players. A suitable mix of optional features can make that quest possible and more fun along the way.

For new players, your score should be a minor consideration. Concentrate instead on having fun, learning the game, and meeting each new challenge. Scoring is mainly for very experienced players striving for an additional measure of success. Once you have reached the end, increasing your score is a way of challenging yourself in future games of *Strike Commander*.



Figure 15-13

Sample player
score after several
missions

Kill Points

At the end of each mission, the program adds up the number of aircraft and ground targets you destroyed and modifies the points for each, depending on the number of game options you are playing with. For example, shooting down an enemy aircraft with a missile is worth 50 points, unmodified. But if you have all of the beneficial game options set in your favor, you score only about half that many points for the plane.

The basic points for each target are increased somewhat if you destroy it with a bomb and increased significantly if you destroy it with the Vulcan cannon.

There are major penalties for destroying friendly aircraft or ground targets by mistake.

Scoring Modifiers

All beneficial game options incur a scoring penalty. The most severe penalties are imposed for Gameplay options. The highest is incurred for playing with Unlimited Ammo. Playing at a Rookie level of difficulty is the next stiffest penalty, half of that charged for Unlimited Ammo. The penalty for both a Veteran level of difficulty and Easy Gun Hits is half that for Rookie level.

The penalties for the various flight and cockpit options are all very small when compared to those for the gameplay options. From these options choose the ones that increase your enjoyment of the game. The penalties for playing with all of these options on adds up to half the penalty for using Unlimited Ammo.

The exact scoring modifier for each game option is listed in the *Strike Commander Playtesters' Guide*.

Additional Points

The single most valuable thing you can do to increase your score is complete the mission satisfactorily. This earns the largest award of points. If you end the mission as a failure or use the Continue option to jump home, you are penalized approximately one-third the points you can earn for completion.

Beyond completing the mission, additional points can be earned for taking off and landing manually. Landing is worth more than twice the points for taking off.

Kill Board

The kill board is maintained by the Wildcats and updated after each mission to show the number of air and ground kills by squadron pilots. You can find the kill board in Virgil's office at the

Wildcat base or in the Strike Base tent. To look at the kill board, move the joystick pointer onto the kill board and press Fire button 1. This expands the kill board to fill the screen so it can be read.

The kill board lists all of the Wildcat pilots. They are ranked from top to bottom in order of total kills. The pilot with the highest combined total of ground target and aircraft kills is placed at the top. After each mission, the board is realigned based on the kills just scored.

The kill board is another way to measure how you are doing in your game. It can also be quick reference before choosing who is to be your wingman on the next mission.



This appendix includes the text of two README.TXT files. The first file accompanied version F1.4 of *Strike Commander*, which was used to prepare this strategy guide. The second file accompanied the first release of *Tactical Operations*, the first expansion pack for *Strike Commander*. (Note: Neither file applies to the new CD version.)

Strike Commander F1.4

This README.TXT file contains important information about *Strike Commander* that did not make it into the manuals. Please read this file completely.

Contents

1. Extended Memory Required for Play
2. Warning for People With Non-Microsoft Mouse Drivers
3. Warning for People with 16MB or more of Random Access Memory
4. Warning about Changing Hardware
5. Player Score
6. Engine Noise
7. Radar and Infrared Warning Lights
8. Damage Multifunction Display
9. Reference Card Errata
10. Thrustmaster and Flight Stick Pro Joysticks
11. Thrustmaster Weapon Control System DIP Switches
12. CH GameCard III Automatic
13. Rookie, Veteran, and Ace Options

14. Unlimited Ammo Option
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16. CD-ROM Drive Problem
17. Saved Game Limit
18. Show Weapons
19. Soundblaster Autodetection
20. Creating a Boot Disk
21. QEMM's OPTIMIZE program
22. DOS 5.0 SMARTDRV.SYS
23. Reinstalling
24. *Strike Commander* and DOS 6.00+
25. If You Still Have Trouble...

1. Extended Memory Required for Play

The Installation Guide for *Strike Commander* states that a minimum of 2.1MB of available extended memory is required to play the game with no sound and with a minimum level of detail. This number is incorrect. You actually need a Bare Minimum of 2.5 Megs of available extended memory to play the game.

2. Warning for People with Non-Microsoft Mouse Drivers

You may experience trouble running *Strike Commander* with a non-Microsoft (or 100 percent compatible) mouse driver. If you do, any of the following steps should fix the problem:

1. Replace the mouse driver with a Microsoft mouse driver.
2. Disconnect your mouse and use your keyboard or joystick instead.
3. Remove the mouse driver and use your keyboard or joystick instead.

3. Warning for People with 16MB or More of Random Access Memory

Because direct memory access (DMA) will not work with memory addresses above 16MB, the digitized speech of *Strike Commander* may not work correctly on machines with large amounts of memory. If you hear static in the game when speech would be more appropriate, then this problem could be occurring. The best solution is to remove your memory manager and let the game supply the high memory using its own memory manager. See the Installation Guide for more details on memory configuration.

4. Warning about Changing Hardware

If you change your hard drive and video card, you must reinstall *Strike Commander* or the game will not work correctly. Symptoms

of this not working correctly include not being able to set the plane's throttle above MIL 2. If this is happening to you, do not panic. Simply reinstall the game. Your saved games will remain intact. You can also copy your saved games to a floppy for backup purposes without any harm to them. Simply copy all of the files in the *Strike Commander* directory that have the extension .SAV to a safe place.

5. Player Score

The game keeps a running total score of how well the player is doing. You can look at your score by pressing **[Alt] - [S]** during the cinematic option screens. To maximize your score, play the game at an Ace level of difficulty.

6. Engine Noise

Strike Commander cannot simultaneously run both music and engine noise. If you want to hear the engine noise, turn the music off.

7. Radar and Infrared Warning Lights

An undocumented feature has been added to the warning lights in the cockpit. As missiles close in on you, the lights blink faster.

8. Damage Multifunction Display

The Damage multifunction display (MFD) has an undocumented feature: systems that are damaged but not destroyed appear in yellow. Only when a system is destroyed does it appear in red.

9. Reference Card Errata

The following are errors in the reference card:

- The **[Q]** key does not select previous weapon. It has no function.
- The **[5]** key does not recenter the stick in keyboard flight. The keyboard automatically recenters.
- The right mouse button does not cause the mouse to go into panning mode. If you wish to use the mouse as the cockpit panning control, select the mouse panning option from the flight option screen.
- The Arrow keys do not rotate objects in the Object Viewer. These keys move the cursor.

10. Thrustmaster and Flight Stick Pro Joysticks

The third and fourth buttons on the Thrustmaster and Flight Stick Pro (FSPRO) joysticks are incorrectly documented. The third button selects targets and the fourth button switches you back to

the forward cockpit view. If you select the FSPro panning option in the flight control options screen, the coolie hat on your Thrustmaster or FSPro will control cockpit panning. Selecting the FSPro flight control option will enable the extra buttons on your Thrustmaster or FSPro.

11. Thrustmaster Weapon Control System DIP Switches

The DIP switch settings on the Weapon Control system for *Strike Commander* are switches 1, 2, and 6 on. All other switches should be off.

12. CH GameCard III Automatic

The CH GameCard III Automatic requires a program to be run whenever the machine boots up. This program is called CHJOY3.EXE. Please be sure that this program runs before calibrating joysticks in *Strike Commander* or unpredictable results will occur.

13. Rookie, Veteran, and Ace Options

The main Game Options screen (accessed by pressing **[Alt]** - **[O]** during flight) allows you to select Rookie, Veteran, or Ace difficulty levels. The various changes these modes will make to other options are summarized in Table A-1.

14. Unlimited Ammo Option

The Unlimited Ammo option applies only to gun rounds while playing *Strike Commander*. It will not give you unlimited missiles or bombs. The only exception to this rule is the training mission, during which the Unlimited Ammo option gives you unlimited amounts of whichever weapons you are carrying.

15. SCSI Drive Problems

The sound card detection routines conflict with small computer system interface (SCSI) drives. If you are using an SCSI hard drive, then you should not allow the INSTALL program to autodetect your sound cards. You will be able to select your sound card manually from a menu so that *Strike Commander* will be properly installed.

16. CD-ROM Drive Problem

The INSTALL program cannot recognize CD-ROM drives that have not been fully initialized by the system. This usually happens because the drive has not been turned on before powering up the

Table A-1 Options Activated by Level of Difficulty

Effect	Level of Difficulty		
	<i>Rookie</i>	<i>Veteran</i>	<i>Ace</i>
Midair Collisions	OFF	ON	ON
Easy Landings	ON	ON	OFF
Stalls	OFF	ON	ON
Unlimited Ammo	ON	OFF	OFF
Easy Gun Hits	ON	ON	OFF
Enemy Intelligence	Rookie	Veteran	Ace
Auto-Targeting	ON	ON	OFF
360 Degree Targeting	ON	ON	OFF
Smart Targeting	ON	ON	OFF
Sun Glare	OFF	ON	ON
Gravity Effects	OFF	ON	ON
Smart Radar	ON	OFF	OFF
360 Degree Radar	ON	OFF	OFF
Smart RAW Scope	ON	OFF	OFF

computer. Installation can bypass this problem by the command line parameter "-A." For example, type **INSTALL -A** after the prompt A:\> to prevent the INSTALL program from trying to detect your drives. You will be asked to type in the letter of the drive on which you want to install *Strike Commander*.

17. Saved Game Limit

Strike Commander will recognize only the first 100 saved games in the GAME directory. All additional saved games are ignored and cannot be selected in the Save/Load menu. You may delete unwanted saved games by using the DOS Delete command.

18. Show Weapons

The Show Weapons feature in *Strike Commander* will show only those weapons on the player's plane and on planes that are viewed using the F6 camera.

19. Soundblaster Autodetection

If you have a Soundblaster with an IRQ setting other than 7, the INSTALL program will incorrectly autodetect it as an Adlib card. To avoid this problem, make sure you explicitly select the Soundblaster sound card option during installation.

20. Creating a Boot Disk

You may need to add lines to the basic boot disk CONFIG.SYS and AUTOEXEC.BAT for *Strike Commander* to support certain sound cards, game cards, and other hardware. Consult your documentation for these products.

21. QEMM's OPTIMIZE program

Some versions of QEMM's OPTIMIZE program add lines to the CONFIG.SYS and AUTOEXEC.BAT, which may cause problems with *Strike Commander*. If you experience problems after running this program, your old CONFIG.SYS and AUTOEXEC.BAT are stored in CONFIG.QDK and AUTOEXEC.QDK. Copy these files over the new CONFIG.SYS and AUTOEXEC.BAT.

22. DOS 5.0 SMARTDRV.SYS

Strike Commander does not support the SMARTDRV.SYS that comes with some versions of DOS. It does support SMARTDRV.EXE, which comes with Windows 3.0 or better.

23. Reinstalling

Should you find it necessary to reinstall *Strike Commander*, we recommend that you first delete all the files in the *Strike Commander* directory except the files with the .SAV extension (these are your saved games). The installation process will not write over them.

24. *Strike Commander* and DOS 6.00+

Although the Installation Guide says it is necessary to reinstall *Strike Commander* if you have first installed the game with version 5.00 and then changed DOS versions to 6.00+, this is no longer necessary. However, because further versions of DOS may cause configuration problems, we recommend that you go ahead and reinstall the game if you have any trouble running *Strike Commander*.

25. If You Still Have Trouble...

If you call Customer Service with a problem, please have the following information handy:

- A listing of your CONFIG.SYS (either from the boot disk or your hard drive)
- A listing of your AUTOEXEC.BAT
- The information you get when you type the DOS command **mem**

If you cannot be near your PC when calling Customer Service, please have printouts of this information. Customer Service needs this information to diagnose properly and correct the problem you are having.

Strike Commander: Tactical Operations

This README.TXT file contains important information about *Strike Commander* and the add-on module, *Tactical Operations*, which did not make it into the manuals. Please read this file completely.

Contents

1. *Tactical Operations* Aborts Installation
2. Full Installation versus Partial Installation
3. Installing *Strike Commander* Speech Accessory Pack after Installing *Tactical Operations*
4. New Features in *Strike Commander*
5. Realistic Flight and Rudder Pedal Support
6. Digital Effects
7. General MIDI Music
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9. Digital Effects versus Old Sound Effects
10. Error Codes 1910 and 1941
11. Joystick Calibration Problems
12. MS-DOS 6.0 and DoubleSpace Disk Compression
13. Internal Stack Overflow Error
14. *Strike Commander* Disk 8 Hangs/Terrain Maps Do Not Generate

1. *Tactical Operations* Aborts Installation

If the *Tactical Operations* installation drops you out to the DOS prompt prematurely, try typing **INSTALL -A** at the DOS prompt to remove a possible conflict with the autodetection function. If the problem persists, contact Origin Product Support.

2. Full Installation versus Partial Installation

To prevent possible redundant map generation during playthroughs, we recommend that you choose the same type of installation for *Tactical Operations* as you did for *Strike Commander*. For example, full installation users of *Strike Commander* should select full installation for *Tactical Operations*.

3. Installing *Strike Commander* Speech Accessory Pack after Installing *Tactical Operations*

If you are going to install the *Strike Commander* Speech Accessory Pack after installing *Tactical Operations* then you will need to edit the SCTO1.CFG file as follows:

1. At the C:\ prompt, type **EDIT C:\SC\SCTO1.CFG**.
2. When the new screen appears, make the following changes:
 =objects.tre
 =textures.tre
 =misc.tre
 =scto1.tre
 =sound.tre
 =gameflow.tre
 =msspeech.tre
 =mgspeech.tre

These line will be followed by two other sound configuration lines. Do not alter their information.

3. When you are finished, press the following keys: **[Alt]**, **[F]**, **[X]**, and **[Y]**. This will allow you to hear speech during *Tactical Operations* only if you have the Speech Accessory pack installed to the same directory. If you are installing *Tactical Operations* after *Strike Commander* and the Speech Accessory Pack, then you will not have to do this.

4. New Features in *Strike Commander*

Realistic Flight, Rudder Pedals, Digital Effects, and General MIDI are new features in *Tactical Operations*. Installing *Tactical Operations* also adds these features to the regular *Strike Commander* missions.

5. Realistic Flight and Rudder Pedal Support

Realistic Flight and Rudder Pedals can be turned on only at the Options menu while in flight. To reach the Options menu while flying, press **[Alt]** - **[O]**. Then press the Flight button. You can now activate the Realistic Flight and Rudder Pedals options by pressing their buttons.

6. Digital Effects

To turn on the Digital Effects feature, press **[Alt]** - **[O]** while in flight. Press the Audio button and make sure that the Digital FX button is pressed down (darkened).

7. General MIDI Music

To utilize the General MIDI (musical instrument digital interface) features, you will have to change your hardware configuration. Type **INSTALL** at the *Strike Commander* directory (default: C:\SC) after installing *Tactical Operations*.

Strike Commander and *Tactical Operations* have joined the next generation of sound quality with their support of the General MIDI standard as defined by the MPU-401 instruction set. At the time of publication, only a few cards support MPU-401. These cards include the Roland SCC-1, Roland RAP-10, Creative Labs Sound Blaster 16 with the attached Waveblaster daughterboard, and the Creative Labs Sound Blaster ASP 16 with the attached Waveblaster daughterboard. Other manufacturers have already or are planning to release sound cards that utilize the MPU-401 instruction set. However, sound cards that use a memory-resident program (TSR) to emulate MPU-401 may not work with this software.

Note *Some General MIDI sound cards offer digitized speech or sound effect capabilities. However, this product may not support the digitized sound or speech capabilities of these cards. As in the case of the Roland RAP-10, customers will need to use a second sound card such as a Sound Blaster, Sound Blaster Pro, or 100 percent compatible sound card for digitized speech and effects. Review your sound card documentation or contact the manufacturer if you have any questions.*

8. SB16/Waveblaster and CH Flightstick Combination

Because of a hardware conflict between the joystick port on the Creative Labs Sound Blaster 16/Waveblaster combination and the CH Flightstick, General MIDI music will not be heard when the Flightstick is connected to the Sound Blaster 16/Waveblaster joystick port. Another manufacturer's joystick or another joystick port must be used to receive the General MIDI music. Contact the respective manufacturers if you have any further compatibility questions.

9. Digital Effects versus Old Sound Effects

With Digital FX turned on, you may on occasion hear the old sound effects. This will happen if a digital effect is supposed to be played at the same time as another digital effect. The chip used by most sound cards to produce digitized sound and effects can play only one digitized effect at a time.

10. Error Codes 1910 And 1941

If you try to start a new game and it crashes to DOS with an Error #1910 or Error #1941, message this is caused by a bad installation or a corrupted file on the original installation. To determine which is the case, boot to a clean configuration that does not load other conflicting device drivers such as a disk cache. See your *Strike Commander* Installation Guide for more information on the proper configuration. Next, delete all files from the *Strike Commander* directory (default: C:\SC). Finally, reinstall *Strike Commander* and *Tactical Operations*.

11. Joystick Calibration Problems

In the event that you experience any joystick calibration problems, be sure that you have only one gameport open for your joystick. This includes gameports present on sound cards, gamecards, or I/O cards. If you are using a multi-speed gamecards, be sure that you have performed the software or speed dial tests for your particular gamecard. If you continue to have problems, try adjusting the speed dial or numeric software settings a little higher than normal. If the problem persists, you may have a defective joystick or gameport.

12. MS-DOS 6.0 and DoubleSpace Disk Compression

Note *Strike Commander* has been fully tested with the DoubleSpace disk compression utility that shipped with MS-DOS 6.0. We cannot guarantee the compatibility of our games with other disk compression utilities.

Because of the large conventional memory requirements of *Strike Commander* and DoubleSpace, we highly recommend that you use the instructions with your *Strike Commander* Installation Guide to make a boot disk. Use the following configuration for your CONFIG.SYS and AUTOEXEC.BAT files.

```
CONFIG.SYS file:
DEVICE=C:\DOS\HIMEM.SYS
DEVICE=C:\DOS\EMM386.EXE 2592 /I=B000-B7FF
RAM
DOS=UMB
DOS=HIGH
FILES=25
BUFFERS=25
SHELL=C:\DOS\COMMAND.COM /P
DEVICEHIGH=C:\DOS\DBLSPACE.SYS /MOVE
AUTOEXEC.BAT file:
```

```
PROMPT $P$G
PATH=C:\DOS
C:
CD SC
SC (or use SCTO1 if you wish to use the disk for Tactical
Operations)
```

Now insert this disk into your A drive and reboot your computer. This disk should automatically take you into the game with plenty of memory.

13. Internal Stack Overflow Error

An internal stack overflow error typically occurs if Sound Blaster 16/Waveblaster owners select General MIDI instead of Waveblaster as their music card during the sound configuration of the INSTALL program. Simply type **INSTALL** from the *Strike Commander* directory (default, C:\SC). Select Waveblaster when prompted for your type of music card.

14. *Strike Commander* Disk 8 Hangs/Terrain Maps Do Not Generate

On some computers such as the IBM Valuepoint and a number of Packard Bells, the *Strike Commander* installation map tries to use a region of upper memory that is already occupied. This will cause Disk 8 to hang up as it approaches the Terrain Map Generation. To remedy this, we recommend that you create a boot by disk using the instructions within the *Strike Commander* Installation Guide. Use the following configuration for your CONFIG.SYS file:

```
DEVICE=C:\DOS\HIMEM.SYS
DEVICE=C:\DOS\EMM386.EXE 2592 /X=E000-EFFF
RAM
DOS=HIGH
FILES=25
BUFFERS=25
SHELL=C:\DOS\COMMAND.COM /P
```

Insert the new boot into your A drive and reboot your computer. Now begin the installation again, beginning with Disk 1, and the terrain maps should be generating at the end of Disk 8. Partial Installation users will see only one map generated before the installation ends. If the problem persists, contact Origin Product Support.

11/11/11
11/11/11

COMPENDIUM OF HINTS



APPENDIX

B

This appendix summarizes all of the warnings and hints that appear throughout the text of this strategy guide. They are listed under the name of the chapter in which they appear.

Chapter 2: The Heads-Up Display



It is possible that in a particularly tight maneuver the Velocity Vector Indicator may disappear off the HUD. This shows that the new direction of the nose is far from the original flight path and previous momentum of the aircraft.



*Once you activate a weapon, it is ready to fire. If you press the **Spacebar** or joystick fire button #1, you fire the weapon. During a game mission, accidentally firing a missile or other valuable weapon can be very costly.*

Chapter 3: Basic Flying



If the angle of attack into the wind becomes too large, the aircraft may stall. (Stalls are discussed later in this chapter.)



A common error of new pilots is to overcompensate on the joystick when trying to maintain altitude in a turn. In many turns, the required amount of back pressure on the stick is relatively slight. Overcorrecting pulls you into a climbing turn or a loop in extreme cases.



Because the flight models of Strike Commander are so realistic, there is another option for compensating for altitude loss in a turn: hitting the rudder opposite the turn to help compensate. For example, when turning slightly to the left, pushing the right rudder may provide enough extra lift to keep any altitude loss to a minimum.



The Split S is a diving maneuver and must be started at some minimum altitude to prevent piling into the ground. Be sure you have several thousand feet of altitude to pull out before starting the maneuver.



Starting an inverted Loop below 2,000 feet risks crashing into the ground. Remember, an inverted Loop starts with a Split S.

Chapter 4: Orientation in the Air



When releasing the joystick after panning, always center the joystick first before releasing the second fire button. If you do this in reverse, releasing the button activates joystick control of the aircraft. If the joystick is not centered, the F-16 goes into an immediate maneuver depending on where the joystick is held.



*Be careful not to press the **[Spacebar]** key to close the NAV map, because it is a fire button. If you are in a weapon mode, pressing this key fires the weapon, even though you are at the NAV map. In this instance you do close the NAV map, but it may be a very expensive and wasteful way to do so.*



*When the Weapon Camera is on, the HUD is not visible and you are blindly controlling your aircraft. You cannot switch targets, and firing weapons blind is probably a waste of munitions. This can be a handicap in a dogfight against several opponents or during a bombing run when you wish to hit several targets on the same pass. Be prepared to press the **[F1]** key and return to the Close Cockpit view, foregoing the fun of watching your weapon home in on its target. You may need to pick up a new target quickly and get ready to fire again, long before the Weapon Camera runs out of footage.*



*When the Victim Camera is on, the HUD is not visible and you are blindly controlling your aircraft. Be prepared to press the **[F1]** key and return to the Close Cockpit view, as soon as the camera confirms that your weapon has hit.*

Chapter 5: Multi-Functional Displays



If there is a chance of missiles being fired at you, don't open a second MFD. Keep the Missile Warning Lights visible to get the earliest possible warning of an approaching missile.



Vehicles moving on the ground appear as two small ground radar blips because of an unforeseen feature of Strike Commander. Moving vehicles have two components: the vehicle itself and a terrain feature tied to it that represents the tread marks appearing behind it as it moves. The ground radar picks up both the vehicle and its tread marks, showing the combined blip. This turns out to be very useful when attacking these targets. When you destroy a moving vehicle, the treads disappear from sight and from radar. So you can distinguish active vehicles from destroyed ones by the multiple radar blips versus the single blips.



*Remember that the number keys used to choose channels and messages are also the keys used to set the throttle. While the Communication Interface screen is up you cannot use these keys to change the throttle setting. You can use the **[+]** and **[-]** keys to increase or decrease throttle.*



*The F-16 in Strike Commander is most fuel efficient when flying at 35,000 feet at Throttle Setting MIL4, set with the **[4]** key. For long flights, rise to 35,000 feet quickly, set your heading, and put the throttle at this setting. This conserves fuel during transit periods when there is no combat action.*



*The Weapons Hardpoint Display only stays up for a few seconds before turning off automatically. If you want to look at it carefully, pause the game when it comes up and take your time examining it. Otherwise, it can turn off before you are finished with it. To open it again you have to press the **[W]** key again, which changes the Weapon mode. You can waste a lot of time getting back to the weapon you want activated.*



Rocket pods do not disappear when they are empty. They remain on your wing and are a source of drag. Once you have fired off all of the rockets within the pods, there is no reason to carry empty pods home. If you engage in air-to-air combat with empty pods on board, don't hesitate to jettison them.

Chapter 6: Game Options



*If you don't wish to watch the title sequence each time you restart Strike Commander, press the **[Esc]** key when the sequence begins. This bypasses the title screens and opens the Start-Up Menu.*



For most versions of Strike Commander, when you push in one of the three buttons to determine the level of difficulty, the input is read but the button does not stay pushed in. Remember which button you have pushed or make a note. Alternatively, you can open the Gameplay submenu and see what the level of enemy intelligence is. If you haven't changed enemy intelligence, the level marked with a pushed button here also indicates the level of difficulty you chose.



In some Strike Commander missions ambushes occur on your way back to base after objectives have been met. If you use the Continue option to go home, you miss these ambushes. You avoid the danger of the ambush, but also miss the opportunity for making more air-to-air kills and score additional points. Also, the Strike Commander Playtesters' Guide indicates that using this option incurs a penalty of nearly one-third the points scored for successfully competing a mission.



If you compare how the game looks at various haze settings you see that there is little noticeable difference between the far and near settings. This was meant to be another way to customize the look of the game versus frame rate, but it didn't work out. Leave the haze in the far setting to get the maximum visual range.



You do not take off with unlimited amounts of chaff or flares with the Unlimited Ammo option on. You still only get 30 of each.



If you have the Unlimited Ammo option on for a training mission, load the minimum of any weapon you intend to take. There is no benefit from carrying additional weapons and no penalty to the F-16's performance unless you are playing with Realistic flight option from Tactical Operations.

Chapter 7: Preparation for Combat



If a rocket pod is not emptied during a mission, it is refilled at no extra cost and returned to inventory when you return. This is a good reason not to fire off your rockets indiscriminately and a way to save a little on squadron finances.



*When changing weapons, be careful not to press the **[Shift] - [W]** keys to cycle backward through the weapons as suggested on page 60 of the Strike Commander Technical Supplement. These keys jettison all air-to-ground weapons instead, as noted on the Strike Commander Reference Card. Contrary to the documentation, there is no way to cycle backward through the weapons.*



If you already have an air-to-air weapon activated other than the Vulcan, pressing the **[G]** key does not activate the cannon, as implied by the Strike Commander Technical Supplement. The air-to-air weapon already active remains so. You must press the **[W]** key to cycle through available air weapons to activate the cannon in this case. Pressing the **[G]** key does turn on ACM Mode regardless of what weapon is active at the time.



During the approach to combat, zoom in the HUD so that the Threat Warning Indicator shows the detailed icons of radar sources. From the detailed icons you can learn more information about the radar source.

Chapter 8: Air-to-Air Missile Combat



Against any multiengine aircraft, one missile hit may not be enough to bring it down. Be prepared to hit these aircraft more than once. However, an aircraft that has taken a hit is vulnerable in a dogfight and should be dispatched with gunfire if you can afford the air time. This saves expensive missiles for undamaged opponents.



Don't fire an AIM-9J if the sun is within sight behind your target. The AIM-9J's heat seeker is not sophisticated enough to distinguish between the sun and your target, and may lock on the sun instead.

Chapter 10: Strafing Ground Attacks



For an unknown reason, Strike Commander doesn't allow you to designate a strafing target when rockets are activated. This means you don't see a Range to Target readout on the HUD and no In Range message appears for rockets.

Chapter 11: Bombing Attacks



Flying above 4,000 feet on a bombing run against antiaircraft guns puts you out of range of the guns until you are directly overhead. However, you must approach at very high speed and it is more difficult to line up properly.



In some versions of Strike Commander, the release point may actually occur when the program is between frames. If this happens, the bombs are not released, as if radar lock was blocked. This means that your bombing run is a failure, unfortunately, no matter how good your shot. At least your bombs are not lost. The slower your system the more likely this is to occur. It is a problem for everyone, however, because on the fastest systems the game slows down to around 10 frames per second in a bombing situation because so many objects are being drawn each frame.

Chapter 12: Smart Weapons



It is possible for the target to remain selected and in view in the Gun Camera, even though you have flown past it. In the Infrared Weapon mode the Gun Camera is replaced by a camera that is part of the infrared guidance system, and one that can pan somewhat to keep a target in view. Do not launch a smart weapon when the target is behind you because it cannot turn around easily and fly back to the target. Expect to miss in this situation. Hits are most likely when the target is in front of the F-16.

Chapter 13: Taking Off and Landing



There is a runway at Wipeout Rock in the training world, but it is under construction and not operating. If you attempt to land here you crash because the program treats the runway as open ground. You cannot use the autopilot to land here either. If you trigger the autopilot over Wipeout Rock, you fly to your next waypoint instead of landing.



In Strike Commander the brakes are unnecessary and have no use in a takeoff. As soon as you punch the afterburner, the F-16 begins rolling down the runway, regardless of whether the brakes are on or not. There seems to be no discernible difference in acceleration with the brakes on or off. However, if the brakes are on as you accelerate down the runway, the nose never rotates, or lifts into the air. If the brakes are not released, you crash off the end of the runway. Brakes have no positive effect in a takeoff and risk a crash if left on. So don't bother with them when taking off.



The autopilot will safely land the F-16 when the landing gear is damaged. (Damaged landing gear is noted on the Damage display when the two circles representing the gear are yellow.) When landing yourself, there is no effect due to damaged landing gear. It operates as if undamaged. Neither you nor the autopilot can land safely with destroyed landing gear (marked in red on the Damage display).

THE STRIKE COMMANDER PLAYTESTERS' GUIDE



APPENDIX

C

This strategy guide is intended to supplement the documentation available with *Strike Commander*, including the separately available *Strike Commander Playtesters' Guide*. For this reason there is little duplication of the material in the guide. This brief introduction to the *Playtesters' Guide* is intended for those players contemplating its purchase.

Mission Description

The bulk of the *Strike Commander Playtesters' Guide* is devoted to a description and analysis of each of the *Strike Commander* game missions. Of the book's 96 pages, 60 discuss the missions.

The Mission Tactics section begins with advice on choosing a wingman and maintaining situational awareness. There is a brief section of general advice and hints on play, followed by information about the training world.

The mission description details the objective, the payoff, any bonuses available, the loadout of weapons on enemy planes that will be encountered, and your wingman's loadout. The descriptions of loadouts for enemy aircraft and your wingman are not available from the game. The other information may be learned from the premission briefing or from the fixer who gives you the mission contract.

A mission chronology is provided that details each of the NAV map waypoints for the mission, plus any special action spheres (SASs) that may pop up. For each waypoint or SAS, the *Playtesters'*

Guide tells you what kind of resistance to expect. For example, during the first mission of *Strike Commander* there is an SAS where you are jumped by enemy fighters. *The Playtesters' Guide* tells you to expect three MiG-21s with rookie pilots. Any targets or ground defenses are also listed here.

The mission analysis is where the Origin playtesters come in. One or more of the people who tested *Strike Commander* offer hints on how best to complete the particular mission. They describe their favorite techniques for completing the mission successfully. In most cases they suggest alternatives to the default weapon loadouts the program puts on your F-16. In some cases they suggest alternatives to the mission chronology set out in the mission briefing.

The mission description concludes with an illustration of the mission world map on which icons of various aircraft and targets have been superimposed, showing graphically the waypoints and what to expect at each. Any SASs present are also indicated.

The mission information is very helpful for those people who don't like surprises. Before attempting the mission, you can learn what to expect and prepare accordingly. Without the information and advice provided here, it may take several additional attempts before a mission can be completed successfully. A number of twists are thrown your way throughout the game. If you find these frustrating, the *Playtesters' Guide* can help you get past them.

Each contract usually involves several missions that take place in the same world and are carried out in sequential order. For each world, the *Playtesters' Guide* provides some introductory information about the missions to follow, including the context in which the missions take place and a description of the forces you are likely to encounter. For the military forces, the *Guide* describes what planes are likely to be around and the skill levels of pilots.

Combat Notes

The *Strike Commander Playtesters' Guide* begins with a five-page section of Combat Notes. This is divided into discussions about the types of missions that you carry out in *Strike Commander*, and descriptions of the air-to-air and air-to-ground weapons available for your use. The mission information is general. For example, it talks about your goals in an air superiority mission and the types of weapons to take along. Weapon information expands on the material provided in the *Technical Supplement* that comes with the game.

Pilots

The Pilots section discusses pilot attributes. Each pilot in the game is rated in nine categories on a scale from 0 to 16, the higher number being better. The three critical categories are flying, air-to-air combat, and air-to-ground combat. The *Playtesters' Guide* explains briefly the effect of each category. It also shows the ratings for all Wildcat pilots plus all pilots you encounter in the game, including training mission pilots. There are ratings for Janet "Vixen" Page, who defects from the Wildcats, and for Jean-Paul Prideaux, a previous defector and current Wildcat competitor you'll face in the mission finale.

Weapon Loadouts

The Weapon Loadouts section lists your wingman loadouts according to mission type. For example, the loadout for a light air-to-air mission is two AIM-9Js. Unfortunately, the mission categories never appear again in the *Playtesters' Guide*. When you look at a mission description, the mission category is not named, although the wingman loadout is listed.

Loadouts are also listed for every enemy aircraft type. Where the same aircraft appears in different worlds, the specific loadout for each world is listed. This information is also available as part of each mission description.

Scoring

Following the mission descriptions, a two-page Scoring section details the scoring system within the game. This describes how scores are determined and the effects of each game option on scoring. Base object point values are listed for everything that you can destroy. All modifiers are listed and then the scoring calculation is described. Any additional points that can be earned are listed, and, finally, some scores to strive for are suggested for each level of difficulty.

Reference

The Reference section begins by describing the various weapons in the game in terms of the damage it causes, its radius of effect, its range, and a number of other characteristics that don't apply to all weapons. Missiles are discussed first, then bombs, and then guns.

The various enemy aircraft, vehicles, and ships are then discussed. Listed for each are the weapons they carry, how tough they are to destroy, and what happens when they explode.

Aircraft data are very detailed. It shows how much damage each aircraft can take in total, and within the various parts of the aircraft. For example, aircraft can take damage in the cockpit, fuselage, elevator, rudder, left wing, or right wing. Within the cockpit, damage may be done to the crew, flight controls, or radio. Each part of the aircraft must take a certain amount of damage to be destroyed.

At the end of this section, a number of representative ground targets are also listed. For each there is a description of the amount of damage they must take to be destroyed and the collateral damage caused when they are destroyed.

Playtesters

The *Playtesters' Guide* ends with biographical data and photographs of the *Strike Commander* playtesters.

TACTICAL OPERATIONS MISSIONS



Tactical Operations

Six months have passed since the events portrayed in *Strike Commander*. The Wildcats are still in business, but business is not good. The Turkish Government has raised taxes again and has made a secret deal with some mercenary squadrons to enforce the tax. In return, the traitors are rumored to be getting a tax break.

The Wildcats decide to act first and attempt to neutralize the Turkish-mercenary alliance. This requires several missions against Syrian bases. At the same time, profitable work has to be found.

New missions in *Tactical Operations* take you to Syria, South Africa, Alaska, Nicaragua, Hawaii, and Ireland. On some of these missions you fly the F-22 you captured at the end of *Strike Commander*. The F-22 is discussed briefly below. During your second mission in South Africa, Lyle is killed when you tangle with the Jackals. There is nothing you can do to prevent this. Lyle is replaced by Ari Benghazi, an ex-Israeli Air Force pilot.

The new missions are much more difficult, on average, than those in *Strike Commander*. You may expect to play many of them over and over before finally succeeding. The difficulty is due to the superior quality of the pilots encountered continually and to the number of enemy planes you have to deal with in each mission.

Flying the F-22

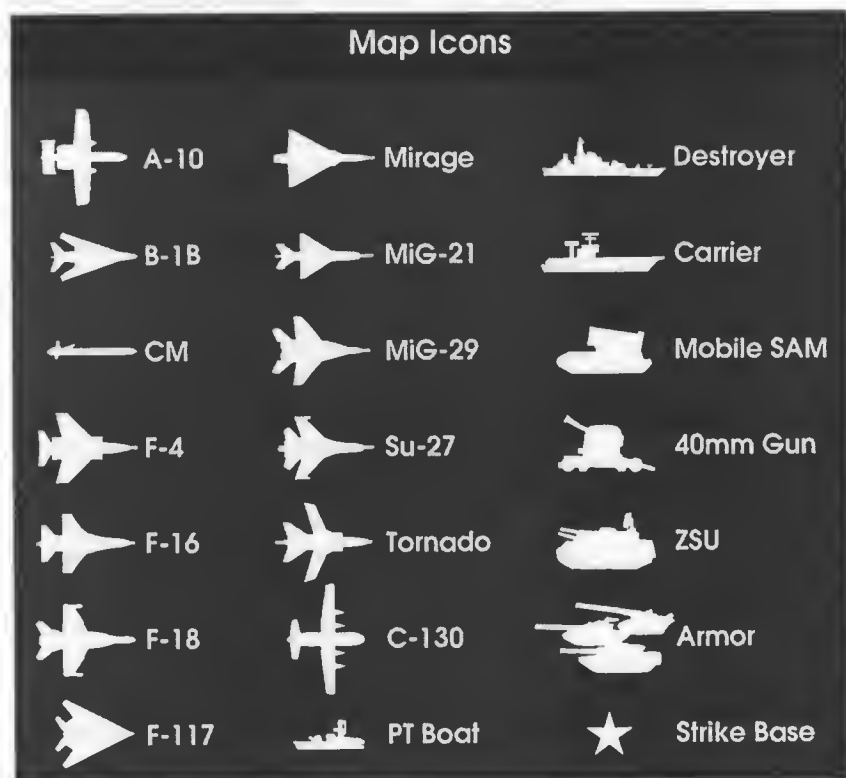
The F-22 was thought to be the hottest dogfight aircraft in the game, but many pilots feel more comfortable with the F-16. The

F-22 is strictly an air superiority fighter. It cannot carry any ground attack weapons except its Vulcan cannon. A disadvantage of the F-22 is that it can carry only four missiles, two AMRAAMs and two Sidewinders. It does carry 60 flares and chaff charges, and, in most missions, you're going to need them all. The F-22 is very fast, but doesn't seem to turn as quickly as the F-16.

Pilot Abilities

For each of the new worlds in which you fly, a table is provided at the end of this Appendix that lists the abilities of the pilots you encounter. Pilots are rated for the same characteristics as *Strike Commander* pilots were in the *Strike Commander Playtesters' Guide*. For those of you who do not own this guide, the ratings range from 0 to 16. Ratings can be modified by the Level of Difficulty and Enemy Intelligence options.

When you begin missions in a new world, check the pilot abilities. Notice that in some cases there are a lot of pilots rated very high for flying and air-to-air combat. Pilot skills are discussed in Chapter 15.



Syria-Mission 1

Objective	Shoot down 4 Mirages at the Training Base Nav point.
Payoff	None
Enemy Loadout	Mirage student (Veteran): 30mm (250), 9J (2) Mirage trainer (Ace): 30mm (450), 9M (2)
Max Wingman Loadout	20mm (1000), 9J (2)

Mission Chronology

You fly the F-22 on this mission. Clear Training Facility air space to make way for Syria Mission 2.

- Nav 1: No enemies.
- Nav 2: Two Mirages (Ace 1, Veteran).
- Training Base: Two Mirages (Ace 1, Veteran), followed by two more Mirages (Ace 1, Veteran). Try to draw them away from the base's ground defenses.
- Nav 4: No enemies.
- Nav 5: Two Mirages (Ace 1, Veteran).
- SAS a,b,and c: Two Mirages (Ace 1, Veteran) followed by two more Mirages (Ace 1, Veteran). These will only come into play if you depart from your preassigned flight path.



Figure D-1
Syria-Mission 1

Syria—Mission 2

Original Objective Destroy targets at the Training base worth 13 Points.

Targets	Runway	1 @ 5 = 5 pts.
	Hangar	2 @ 2 = 4 pts.
	Radar	1 @ 2 = 2 pts.
	Truck	2 @ 1 = 2 pt.
	Jeep	2 @ 1 = 2 pt.
	ZSU	2 @ 1 = 2 pt.
	40mm.	2 @ 1 = 2 pt.
	Tower	1 @ 1 = 1 pt.
	SAM launcher	1 @ 1 = 1 pt.
	Building	1 @ 1 = 1 pt.
	Total	= 22 points

Note *Intercept Nav point doesn't activate until Original Objective is accomplished.*

Primary Objective Shoot down two C-130's at Intercept Nav point.

Payoff None

Enemy Loadout Mirage: 30mm (450), 9M (2)

Max Wingman Loadout 20mm (1000), 9J (2), MK82 (6),
Mav (6)

Mission Chronology

You bomb the Training Base, only to find that most of the equipment and pilots are already being air-lifted to another part of the country. You are then sent to intercept them.

SAS: Two Mirages (Rookie, Ace 2).

Training Base: There are no aircraft left, but considerable amounts of ground forces. Take out the ground air defenses, then bomb the runway and clean up any stragglers.

Intercept: After destroying the Training Base you learn that some of the base equipment is being hauled away in a couple of C-130s (A, B). You are sent to destroy them and their escort of two Mirages (2× Ace 2).

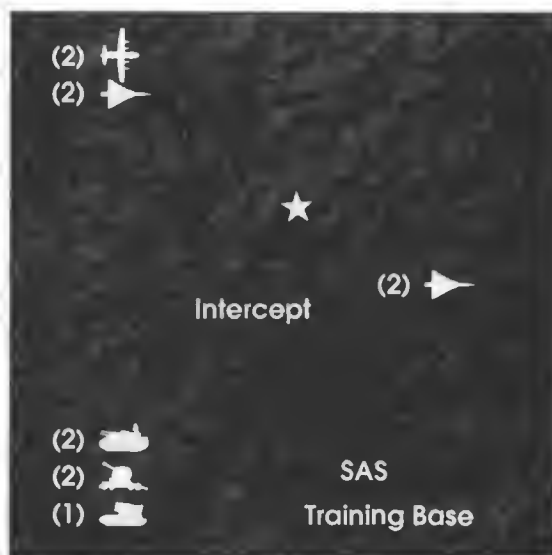


Figure D-2
Syria-Mission 2

South Africa-Mission 1

Objective	Shoot down the two A-10's at Armored Column Nav point.
Mission Failure	Allowing four or more armored column vehicles to be destroyed.
Payoff	\$2.5 million
Bonus	None
Enemy Loadout	A-10: 30mm GAU (1174), Mav (12) MiG-29: 30mm (500), 9M (2)
Max Wingman Loadout	20mm (1000), 9J (2)

Mission Chronology

You fly the F-22 on this mission. Destroy the two A-10s before they destroy the armored column.

SAS a: Two MiG-29s (Ace 2, Ace 3), followed by two MiG-29s (Ace 2, Ace 3), followed by two more MiG-29s (Ace 2, Ace 3).

Nav 1: No enemies.

Armored Column: Two A-10s (Ace 1, Ace 2), being guarded by two MiG-29s (Ace 1, Ace 2). After taking out the MiG-29s, two more show up (Ace 1, Ace 2).

SAS b: Two MiG-29s (Ace 2, Ace 3)

Nav 2: No enemies.

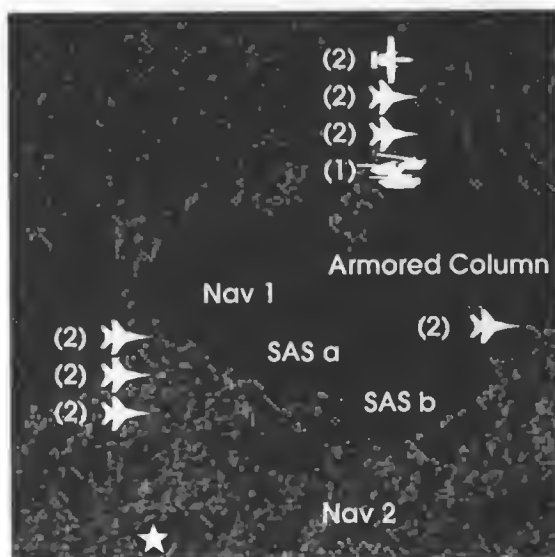


Figure D-3
South Africa -
Mission 1

South Africa–Mission 2

Objective	You are sent to bomb the Zimbabwe base, but your intelligence reports are false and you are ambushed. There is a no way to win this mission.
Payoff	None
Bonus	None
Enemy Loadout	30mm (500), 9M (2)
Max Wingman Loadout	20mm (1000), 9J (2), Mav (6), MK82 (6).

Mission Chronology

After joining Lyle, you find you've been sent into an ambush and Lyle dies.

Rendezvous: Meet Lyle.
 (False) Jackal Base: Two MiG-29s (Jackal 1, Jackal 2), then another wave of two MiG-29s (Jackal 3, Jackal 4).

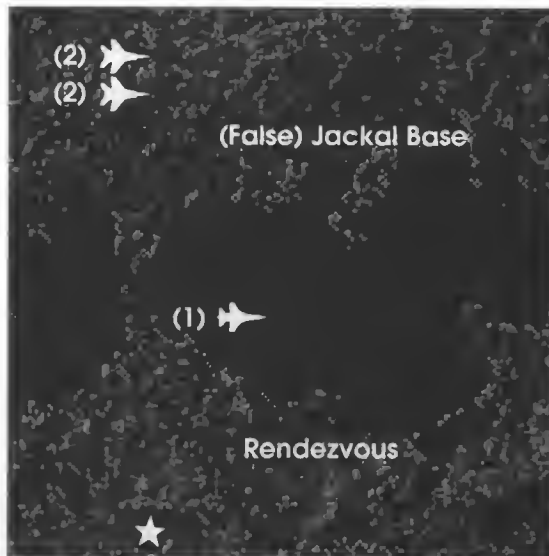


Figure D-4
 South Africa–
 Mission 2

South Africa–Mission 3

Objective	Bomb targets at the Jackal base worth 14 points.	
Targets	Runway	1 @ 7 = 7 pts.
	40mm.	4 @ 1 = 4 pts.
	Hangar	2 @ 1 = 2 pts.
	Building	2 @ 1 = 2 pts.
	Drum	2 @ 1 = 2 pts.
	Radar	1 @ 1 = 1 pt.
	Tower	1 @ 1 = 1 pt.
	Total	= 19 points
Payoff	\$2 million	
Enemy Loadouts	MiG-29: 30mm (500), 9M (2)	
	MiG-21: 23mm (400), 9J (2)	
Max Wingman Loadout	20mm (1000), Mav (6), MK82 (6)	

Mission Chronology

With accurate knowledge of the Jackal base location, fly there and knock it out.

Jackal Base: Two MiG-29s (Ace 3×2); bomb the base.

SAS: Two MiG-29s (Ace 3×2), four ZSUs, and one Mobile SAM.

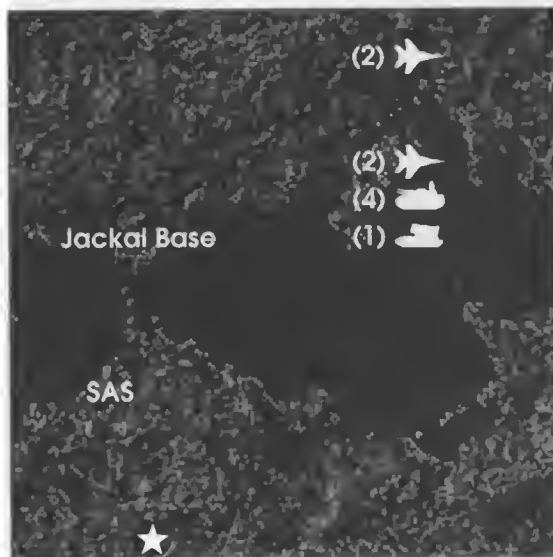


Figure D-5
South Africa–
Mission 3

South Africa–Mission 4

Objective	Bomb targets at the Zimbabwe base worth 14 points.	
Targets	Runway	1 @ 5 = 5 pts.
	Hangar	2 @ 1 = 2 pts.
	ZSU	2 @ 1 = 2 pts.
	SAM launcher	2 @ 1 = 2 pts.
	40mm	2 @ 1 = 2 pts.
	Drum	2 @ 1 = 2 pts.
	Tower	1 @ 1 = 1 pt.
	Building	1 @ 1 = 1 pt.
	Radar	1 @ 1 = 1 pt.
	Total	= 18 points
Payoff	\$2 million	
Enemy Loadouts	MiG-21: 23mm (400), 9J (2)	
Max Wingman Loadout	20mm (1000), 9J (2), Mav (6), MK82(6)	

Mission Chronology

With the Jackal base neutralized, your new target is the Zimbabwe base.

Zimbabwe Base: Two MiG-21s (Veteran ×2). When the base radar is taken out, two more MiG-21s (Rookie ×2).



Figure D-6
South Africa–
Mission 4

Alaska-Mission 1

Objective	Shoot down all enemy aircraft at Intercept Nav point.
Mission Failure	Allow the SU-27 to be shot down.
Payoff	\$2.5 million
Enemy Loadouts	F-4: 20mm (1000), 9J (4), AMRAAM (4) F-117: AMRAAM (2)
Friendly Loadouts	SU-27: 30mm (900)
Max Wingman Loadout	20mm (1000), 9J (4)

Mission Chronology

You fly the F-22 on this mission. Keep the enemy from shooting down the friendly SU-27 (Ursa).

Intercept: Four F-4s (Rookie, Ace 1, Ace 2, Ace 3), and two F-117s.

SAS: Activates after mission is accomplished. Two F-4s (Ace 1, Ace 3).

Note *If the F-117s are not destroyed, you meet them again in Alaska Mission 3.*

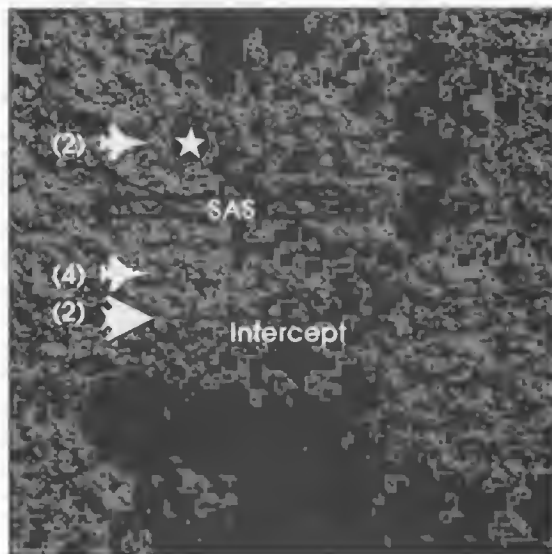


Figure D-7
Alaska-Mission 1

Alaska-Mission 2

Objective	Defend base.
Mission Failure	Allow the enemy to bomb targets at your base worth 4 points.
Targets	Hangar 2 @ 2 = 4 pts.
	Building 1 @ 2 = 2 pts.
	Drum 2 @ 1 = 2 pts.
	Total = 8 points
Payoff	None
Enemy Loadouts	F-18: 20mm (600), 9J (2)
	F-4: 20mm (900), 9J (4), Mav (6), MK82 (6).
	Max Wingman Loadout 20mm (1000), 9J (4)

Mission Chronology

Defend base.

Intercept: Four F-4s (2× Ace 2, 2× Ace 2).

Strike Base: Two F-117s and three F-18s.



Figure D-8
Alaska-Mission 2

Alaska-Mission 3

Objective	Destroy targets at the Enemy Base worth 7 points.	
Targets	Hangar	2 @ 2 = 4 pts.
	Runway	1 @ 2 = 2 pts.
	Building	2 @ 1 = 2 pts.
	Tower	1 @ 2 = 2 pts.
	Drum	1 @ 1 = 1 pt.
	Total	= 11 points
Payoff	\$3.5 million	
Bonus	\$100,000 per plane shot down (\$800,000 maximum)	
Enemy Loadouts	F-16: 20mm. (1000), 9M (2)	
	F-18: 20mm. (600), 9J (2)	
Max Wingman Loadout	30mm (900)	

Mission Chronology

With a Siberian wingman, attack the Alaskan air base.

Rendezvous: Meet your wingman, Kodiak.

Nav 1: Two F-16s (Veteran, Rookie), followed by two more F-16s (Veteran, Rookie)

SAS: Two F-18s (Veteran, Rookie).

Enemy Base: Bomb base.

Nav 2: Your wingman breaks off and returns to his base.



Figure D-9
Alaska-Mission 3

Alaska-Mission 4

Objective	Destroy two of the three C-130s at Intercept Nav point.
Payoff	\$2 million
Bonus	\$500,000 for destroying all C-130s
Enemy Loadouts	F-4: 20mm (600)
Max Wingman Loadout	No wingman

Mission Chronology

You fly the F-22 on this mission with no wingman. Intercept and shoot down fleeing cargo planes.

Intercept: Three C-130s and two F-4s (Rookie, Ace 1), followed by two more F-4s (Ace 1, Ace 3).

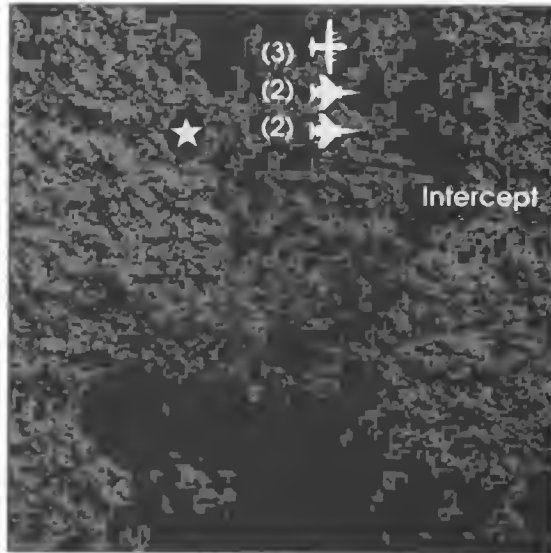


Figure D-10
Alaska-Mission 4

Syria-Mission 3

Objective	Destroy enemy Tornados at Nav points 2 and 3.
Payoff	None
Enemy Loadouts	27mm (500), 9M (4)
Max Wingman Loadout	20mm (1000), 9J (4)

Mission Chronology

You fly the F-22 on this mission. Clear airspace around terrorist training facility.

Nav 1: No enemies.

Nav 2: Four Tornados (Rookie, Veteran, Ace 1, Ace 2).

Nav 3: Two Tornados (Ace 3, Ace 4).

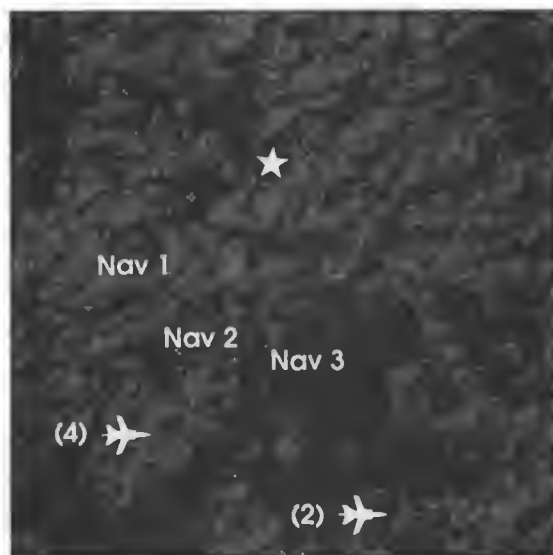


Figure D-11
Syria-Mission 3

Syria–Mission 4

Objective	Destroy targets at the Training Facility worth 23 points.	
Targets	Building	2 @ 5 = 10 pts.
	Hangar	2 @ 4 = 8 pts.
	40mm.	4 @ 1 = 4 pts.
	Radar	1 @ 3 = 3 pts.
	ZSU	2 @ 1 = 2 pts.
	SAM launcher	2 @ 1 = 2 pts.
	T-72	2 @ 1 = 2 pts.
	BMP	2 @ 1 = 2 pts.
	Total	= 33 points
Payoff	None	
Enemy Loadouts	27mm (500), 9M (4)	
Max Wingman Loadout	20mm (1000), 9J (4), Mav (6), MK82 (6)	

Mission Chronology

Destroy terrorist training facility.

Nav 1: No enemies.

Training Facility: Two Tornados (Rookie, Veteran). If you destroy 12 points of ground targets, then two more Tornados (Ace, Ace), then one Tornado (Ace).

Nav 2: No enemies.



Figure D-12
Syria–Mission 4

Nicaragua-Mission 1

Objective	Destroy the four F-4s at Settlement Nav point.
Mission Failure	Allow the enemy F-4s to destroy four of the settlement buildings.
Payoff	\$1.5 million
Enemy Loadouts	F-4: 20mm (900), 9J (4), GBU-15 (2) F-18: 20mm (600), 9J (2)
Max Wingman Loadout	20mm (1000), 9J (4)

Mission Chronology

Defend friendly settlement against enemy bombers.

Settlement: Two F-18s, followed by two F-4s with two F-18s as cover, then another wave of two F-4s and two F-18s.

Nav 1: No enemies.

Nav 2: No enemies.

Nav 3: Two F-18s.



Figure D-13
Nicaragua-
Mission 1

Nicaragua–Mission 2

Objective	Destroy the two F-4s at Prinzapolca Nav point.
Mission Failure	Allow F-4s to destroy the BIA Headquarters.
Payoff	\$2.5 million
Enemy Loadouts	F-4: 20mm (1000), 9J (2), Mav (12) F-18: 20mm (600), 9J (2)
Max Wingman Loadout	20mm (1000), 9J (4).

Mission Chronology

Defend BIA HQ in downtown Prinzapolca.

Prinzapolca: Two F-18s, followed by two more F-18s, then two F-4s.

Nav 1: No enemies.

Nav 2: No enemies.

Nav 3: Two F-18s.



Figure D-14
Nicaragua–
Mission 2

Nicaragua—Mission 3

Objective	Destroy Minister's office at Prinzapolca Nav point.
Mission Failure	Any collateral damage to non-enemy targets.
Payoff	\$3 million
Enemy Loadouts	F-18: 20mm (600), 9J (2)
Max Wingman Loadout	20mm (1000), 9J (2), Mav (6), MK82 (6)

Mission Chronology

Destroy Minister's office in downtown Prinzapolca as wave after wave of fighters try to stop you.

Prinzapolca: Four F-18s, followed by two more F-18s, then two more F-18s.



Figure D-15
Nicaragua—
Mission 3

Nicaragua–Mission 4

Objective	Destroy Minister's private hydrofoil at Yacht Nav point.
Mission Failure	Any collateral damage to non-enemy targets.
Payoff	\$5 million
Enemy Loadouts	F-18: 20mm (600), 9J (2) F-4: 20mm (1000), 9M (4), AMRAAM (4)
Max Wingman Loadout	20mm (1000), 9J (2), Mav (6), MK82 (6)

Mission Chronology

Fly in, take out the hydrofoil, and get out quick.

Yacht: Two F-18s, the Minister's hydrofoil, and two gunboats escorting him. Followed by two F-4s, then two more F-18s, then two more F-4s. There is also a neutral Destroyer and two oil tankers that you are not to destroy.

SAS: Two F-18s.

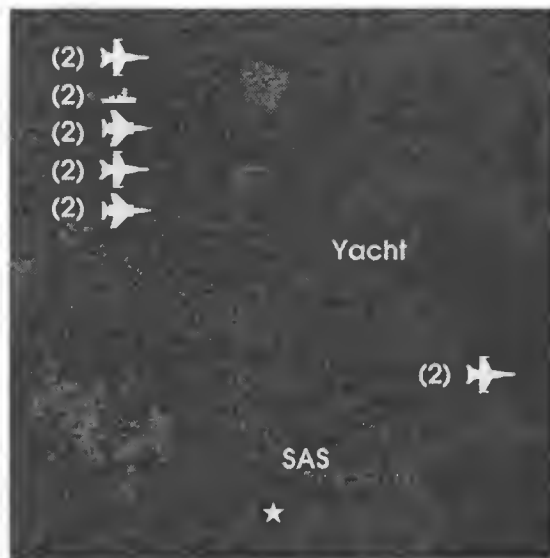


Figure D-16

Nicaragua–
Mission 4

Hawaii-Mission 1

Objective	Destroy targets at the US base Nav point worth 8 points.	
Targets	Building	2 @ 2 = 4 pts.
	Hangar	2 @ 2 = 4 pts.
	Runway	1 @ 3 = 3 pts.
	Drum	2 @ 1 = 2 pts.
	Total	= 13 points
Payoff	\$2.5 million	
Bonus	\$100,000 per plane shot down (\$800,000 maximum)	
Enemy Loadouts	20mm (600), 9J (2)	
Max Wingman Loadout	20mm (1000), 9J (2), Mav (6), MK82 (6)	

Mission Chronology

Destroy US base.

Nav 1: No enemies.

SAS: Four F-18s (Ace x2, Veteran, Rookie).

US Base: Two F-16s (Veteran, Rookie), followed by two more F-16s (Veteran, Rookie).

Nav 2: No enemies.

Note *If Carrier is destroyed in this mission you skip Hawaii Missions 2, 3, and 4.*



Figure D-17
Hawaii-Mission 1

Hawaii–Mission 2

Objective	Shoot down all enemy planes or destroy Carrier at Carrier Nav point.
Payoff	\$2.5 million
Enemy Loadouts	20mm (600), 9J (2)
Max Wingman Loadout	20mm (1000), 9J (4)

Mission Chronology

Take out Carrier air defenses or the Carrier itself.

Patrol 1: No enemies.

Patrol 2: Two F-18s (Ace, Rookie), followed by two more F-18s (Veteran, Rookie).

Carrier: Carrier, three Destroyers, two PT Boats, and two F-18s (Ace, Veteran), followed by four more F-18s (Rookie $\times 2$, Veteran, Ace).

Patrol 3: No enemies.

SAS: If you have accomplished the mission objectives, four F-18s (Rookie $\times 2$, Veteran, Ace).

Note *If Carrier is destroyed in this mission you skip Hawaii Missions 3 and 4.*

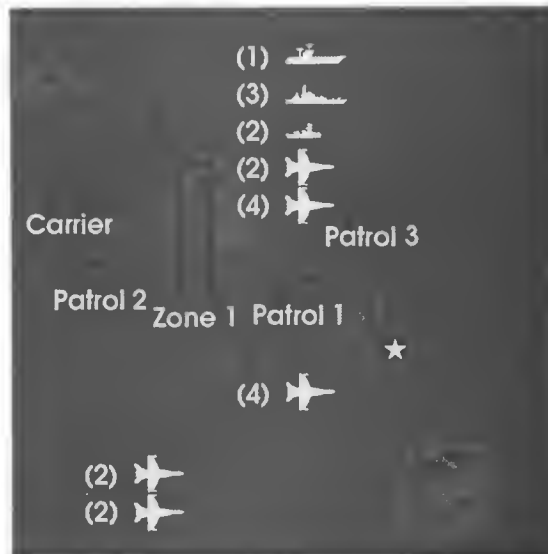


Figure D-18
Hawaii–Mission 2

Hawaii-Mission 3

Objective	Destroy attacking enemy aircraft at Strike Base Nav point.		
Mission Failure	Allowing the enemy to destroy targets worth 6 points at your Strike Base.		
Targets	Hangar	2 @ 2 = 4 pts.	
	Runway	1 @ 3 = 3 pts.	
	Radar	1 @ 2 = 2 pts.	
	Drum	2 @ 1 = 2 pts.	
	Total	= 11 points	
Enemy Loadouts	20mm (600), 9J (2)		
	20mm (600), 9J (2), RP (2)		
	20mm (600), 9J (2), Mav (6)		
Max Wingman Loadout	20mm (1000), 9J (4)		

Mission Chronology

Defend your Strike Base.

Strike Base: Two F-18s (Ace, Veteran), followed by two more F-18s (Ace x2), followed by two more F-18s (Rookie, Veteran), followed by two more F-18s (Veteran, Rookie), followed by two more F-18s (Veteran, Ace), followed by two more F-18s (Veteran, Ace).

Note *If Carrier is destroyed in this mission you will skip Hawaii Mission 4.*



Figure D-19
Hawaii-Mission 3

Hawaii–Mission 4

Objective	Destroy Carrier at Target Nav point.
Payoff	\$3 million
Enemy Loadouts	20mm (600), 9J (2)
Max Wingman Loadout	20mm (1000), 9J (2), Mav (6), MK82 (6)

Mission Chronology

Destroy Carrier.

- Target: Carrier, three Destroyers, two PT Boats, and two F-18s (Ace, Veteran), followed by two more F-18s (Veteran, Rookie).
- Nav 1: Two F-18s (Ace, Veteran).
- Nav 2: No enemies.
- SAS: Four F-18s (Ace, Veteran, Rookie x2).



Figure D-20
Hawaii–Mission 4

Nicaragua-Mission 5

Objective	Destroy all enemy aircraft at Nav points 3, 5, and 6.
Payoff	\$2 million
Bonus	None
Enemy Loadouts	F-4, F-16 Ace: 20mm (900), 9M (4), AMRAAM (4) F-4 Rookie: 20mm (900), 9J (4), AMRAAM (4)
Max Wingman Loadout	20mm (1000), 9J (4)

Mission Chronology

This is an air superiority patrol. The enemy is a mercenary squadron called the Rhinos, composed mostly of US veterans. They fly older aircraft, primarily F-4s. You fly a patrol route and meet several waves of planes in three of the six areas.

Nav 1: No enemies.

Nav 2: No enemies.

Nav 3: Four F-4s (Veteran 1 \times 3, Veteran 2).

Nav 4: No enemies.

Nav 5: Two F-4s (Veteran 3, Ace), followed by two F-4s (Veteran 4, Veteran 5).

Nav 6: Two F-16s (Ace 1, Ace 2).

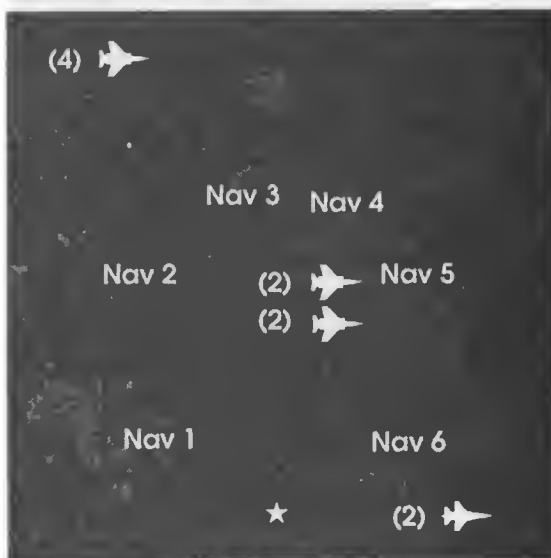


Figure D-21

Nicaragua-
Mission 5

Nicaragua–Mission 6

Objective	Destroy targets at the Rhino base worth 9 points.	
Targets	Runway	1 @ 3 = 3 pts.
	Hangar	2 @ 1 = 2 pts.
	40mm.	2 @ 1 = 2 pts.
	Building	2 @ 1 = 2 pts.
	Radar	1 @ 1 = 1 pt.
	Tower	1 @ 1 = 1 pt.
	Total	= 11 points
Payoff	\$2.5 million.	
Enemy Loadouts	20mm (900), 9J (4), AMRAAM (4)	
Max Wingman Loadout	20mm (1000), 9J (2), Mav (6), MK82 (6)	

Mission Chronology

An informant has disclosed the location of the Rhino's base. Destroy the base and avoid getting shot down by the F-4s and F-16s flying air cover.

Nav 1: No enemies.

SAS a: Two F-4s (Ace 4, Veteran 6), then two more F-4s (Rookie 1, Ace 4).

Rhino Base: Two F-16s (Ace 5, Rookie), followed by two F-4s (Ace 4, Veteran 1), then two more F-16s (Rookie 2, Ace 5).

SAS b: Two F-4s (Ace 3, Ace 4).

Nav 2: No enemies.



Figure D-22
Nicaragua–
Mission 6

Nicaragua-Mission 7

Objective	Destroy all 19 vehicles at the Armored Column Nav point.
Payoff	\$2.5 million
Enemy Loadouts	20mm (900), 9M (4), AMRAAM (4)
Max Wingman Loadout	20mm (1000), 9J (2), Mav (6), RP (2)

Mission Chronology

The Rhinos have relocated to a new airfield on the coast and have just received a shipment of tanks and trucks with which they plan to soon raid a POW camp. Destroy all of the enemy vehicles.

Nav 1: No enemies.

Landing Site: Two F-4s (Ace 2x2), followed by two F-16s (Ace 3, Ace 4).

Vehicles: Eight T-72s, four BMPs, four jeeps, and three trucks.

SAS: Two F-16s (Ace 1, Ace 2)



Figure D-23
Nicaragua-
Mission 7

Ireland–Mission 1

Objective	Destroying 5 Tomahawks before they reach Ireland wins the endgame.
Failure	Allowing at least one Tomahawk to reach Ireland loses the endgame.
Payoff	None
Enemy Loadouts	B-1B: Nuclear Tomahawks (5)
Max Wingman Loadout	20mm (1000), 9J (4)

Mission Chronology

Ireland depends on you to shoot down five Tomahawk cruise missiles headed for Dublin.

Intercept: You arrive at the intercept point just in time to see the B-1B launch its payload of cruise missiles. You and your wingman must shoot them down as they split up and converge on Dublin.

Dublin: No enemies.

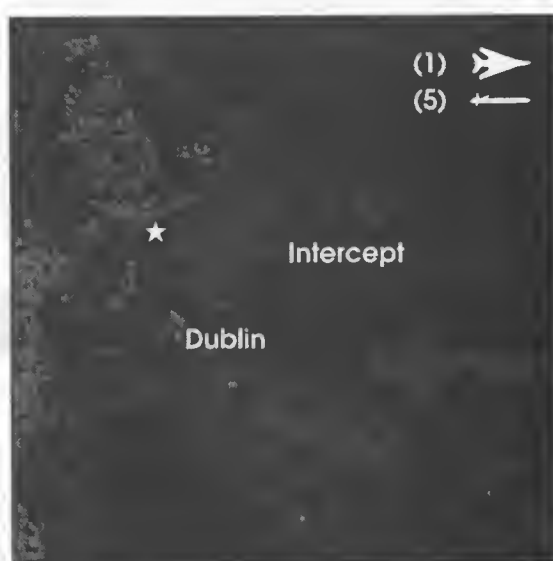


Figure D-24
Ireland–Mission 1

Table D-1 Pilot Abilities: Syria

Pilot	TH	CN	VB	LY	FL	AG	AA	SM	AG
Mirage									
Rookie	8	10	10	10	8	8	8	8	8
Veteran	12	8	16	10	12	12	12	16	16
Ace 1	2	15	16	10	15	15	15	14	15
Ace 2	9	16	16	16	16	16	16	16	16
C-130									
A	0	11	16	16	0	0	0	0	0
B	0	9	14	14	0	0	0	0	0

Table D-2 Pilot Abilities: South Africa

Pilot	TH	CN	VB	LY	FL	AG	AA	SM	AG
MiG-29									
Ace 1	9	15	16	10	15	15	15	12	15
Ace 2	4	15	16	10	12	15	12	12	12
Ace 3	5	13	16	16	16	13	16	16	16
A-10									
Ace 1	8	15	16	16	15	16	16	12	16
Ace 2	0	15	16	16	15	16	16	12	16
MiG-21									
Ace	9	13	16	16	16	13	16	16	16
Veteran	9	14	16	16	14	13	13	8	16
Rookie	6	13	10	16	10	13	10	5	10

Table D-3 Pilot Abilities: Alaska

Pilot	TH	CN	VB	LY	FL	AG	AA	SM	AG
F-4									
Rookie	10	10	16	10	6	8	6	8	10
Ace 1	1	13	15	10	14	13	15	8	15
Ace 2	2	16	16	10	14	13	12	7	15
Ace 3	0	16	16	10	15	13	15	8	15
F-117	8	13	10	16	15	16	16	5	13
F-18	10	13	10	16	10	13	10	5	10
C-130	0	5	10	10	0	0	0	0	0
Friendly Aircraft- SU-27									
Ursa	7	9	8	16	13	9	12	2	8
Kodiak	5	13	8	16	13	9	14	4	10

Table D-4 Pilot Abilities: Syria Again

Pilot	TH	CN	VB	LY	FL	AG	AA	SM	AG
Tornado									
Rookie	16	16	10	16	9	5	9	6	4
Veteran	10	16	12	16	14	14	13	10	16
Ace 1	7	16	10	16	16	16	16	10	14
Ace 2	8	16	10	16	16	16	16	10	16
Ace 3	8	16	6	16	16	16	16	6	16
Ace 4	8	16	16	16	16	16	16	16	16

Table D-5 Pilot Abilities: Nicaragua

Pilot	TH	CN	VB	LY	FL	AG	AA	SM	AG
F-4	7	10	16	10	16	14	16	8	16
F-18	9	16	16	16	16	16	16	16	16

Table D-6 Pilot Abilities: Hawaii

Pilot	TH	CN	VB	LY	FL	AG	AA	SM	AG
F-16									
Veteran	5	12	10	15	10	13	10	5	10
Rookie	10	10	16	10	6	8	6	8	10
F-18									
Ace	2	13	15	10	14	14	15	8	14
Veteran	5	13	10	16	10	13	10	5	10
Rookie	10	10	16	10	6	8	6	8	10

Table D-7 Pilot Abilities: Nicaragua Again

Pilot	TH	CN	VB	LY	FL	AG	AA	SM	AG
F-4									
Rookie	1	2	14	16	10	8	13	8	8 16
Rookie	2	14	13	16	16	8	13	8	16 8
Veteran 1	9	14	16	10	14	13	13	8	12
Veteran 2		2	14	16	10	12	13	13	8 11
Veteran 3		10	10	16	10	10	13	13	8 8
Veteran 4		16	14	16	6	10	13	13	8 16
Veteran 5		2	14	16	10	14	13	13	8 16
Ace 1	4	14	2	10	16	13	16	8	2
Ace 2	10	15	16	10	15	15	15	12	15
Ace 3	9	13	11	14	14	13	16	16	12
Ace 4	9	13	16	16	16	13	16	16	16
F-16									
Rookie 1	0	16	16	16	0	0	0	16	0
Rookie 2	2	14	16	10	8	13	8	8	16
Ace 1	6	16	16	16	16	16	16	16	16
Ace 2	10	16	16	10	15	12	15	8	16
Ace 3	6	16	16	16	15	15	15	12	16
Ace 4	6	15	16	10	12	15	15	12	15
Ace 5	16	13	16	16	16	13	16	16	16

Table D-8 Pilot Abilities: Ireland

Pilot	TH	CN	VB	LY	FL	AG	AA	SM	AG
B-1B	0	16	0	16	16	15	0	0	16

STRIKE COMMANDER CD-ROM



E

Strike Commander CD is the CD-ROM version of the original game that includes a number of new features and improvements. All of the original game is included, plus the newly released *Tactical Operations*. As part of the *Tactical Operations* package, you receive 24 new missions. The new missions are described in Appendix D.

A number of additional features have also been added to make the CD version of *Strike Commander* even more attractive. Features new to *Strike Commander CD* and not found in *Tactical Operations* include the new Gauntlet game, a new hazing option, the invisible cockpit, and new digitized speech.

The Gauntlet Game

From the Training Mission menu you may now select the Gauntlet game. This is intense air-to-air combat practice. In fact, you have no chance to win and must eventually be shot down. Your goal is to last as long as you can.

The Gauntlet is useful for practicing the air combat encountered in the tougher missions, especially those found in *Tactical Operations* and missions that may be forthcoming. The Gauntlet offers a quick, yet challenging, game for anyone who doesn't want to engage in the complete flying considerations of game missions.

Playing the Gauntlet

The Gauntlet opens in the training world, where you immediately encounter two SU-27 fighters, two MiG-29s, and two F-4s,

all piloted by Ace pilots of the highest skill. If you manage to shoot down any pair of these enemy aircraft, a new pair immediately appears to take their place. The new aircraft may be the same as have appeared already, or they may be fighters you haven't seen yet. The Gauntlet continues until you are shot down, until you eject, or until you run out of fuel.

Although enemy pilots have the highest skills possible, you can reduce their skill by playing at a lower level of difficulty and a lower level of enemy intelligence. These options can be changed from the Configuration menu. Adjusting these game options reduces the score of your encounter with the Gauntlet, as discussed below.

You begin each Gauntlet with 1,000 rounds of cannon ammunition and four AIM-9J missiles. You may play with the option Unlimited Ammo turned on. Opponent aircraft all start with their normal load of cannon ammunition. F-4s, however, also are equipped with two AIM-9Js each.

Gauntlet Scoring

When you are shot down or otherwise end the Gauntlet, your score for the game is displayed. This score is determined from the number of aircraft you shoot down and is modified by the play options you have in effect, as in *Strike Commander* and *Tactical Operations*. For example, playing with Enemy Intelligence set at Veteran level incurs a penalty of -5 percent on your score.

Enemy planes shot down with missiles score 500 points, and gun kills score 750 points. The modifiers for various game options are listed in the documentation that accompanies *Strike Commander CD*. If you played with the only option in effect being the Enemy Intelligence set at Veteran level and you shot down one Su-27 with a missile, your score would be 500 (one aircraft shot down with a missile) minus 25 ($500 \times .05$), or 475.

The penalty of -99.5 percent for playing with Unlimited Ammo is not a typo. The designers want to discourage you from employing that option and so have made it nearly impossible to score with it on.

Make a note of your score after each Gauntlet game to measure how you are doing. Compare the scores of several Gauntlet games and attempt to set new records for yourself.

New Hazing Option

In response to requests from *Strike Commander* owners, the Hazing option has been modified for the CD-ROM version. Now, the

Far Haze option turns off the hazing altogether. No haze is seen through the windscreen. The previous Far Haze option is now the second button.

Unfortunately, no hazing does not mean that terrain and objects previously blocked from view now appear. Instead, nothing is seen where the haze previously appeared, and the view through the windscreen is not as attractive as it was previously. It is now harder to suspend your disbelief that what you are seeing is not real. The frame rate does not increase, despite the fact that haze does not need to be drawn for each frame.

Invisible Cockpit

It is now possible to remove the cockpit from the screen, opening more of the sky to view. Press the **[Ctrl] + [I]** keys to remove the cockpit. The HUD remains visible, as do all MFDs open now or opened later, but most other cockpit features are removed.

The important exceptions to this are Threat Warning Indicator icons and Missile Warning Lights. These do appear in the sky where they would normally appear if the cockpit was in view.

For example, if an infrared missile begins tracking you, the yellow infrared warning light appears in the sky where it would normally appear if the cockpit was restored. The warning light blinks just as it would if a heat-seeking missile was closing on you.

In effect, the Invisible Cockpit option turns off all non-critical artwork in the cockpit view. This opens more of the sky to be seen, yet all of the displays are still available. The cockpit may be less realistic, but you see more of the sky and still receive the same information from the HUD and other sources that you do when the entire cockpit is visible.

Turning on the invisible cockpit does increase the frame rate slightly.

New Digitized Speech

The bulk of the new storage space available to *Strike Commander CD* is used up by new digitized speech—approximately 100 megabytes worth. In this new version, digitized speech is available for nearly every conversation between characters in the game. This adds a great deal to the sensation of interactive cinema.



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